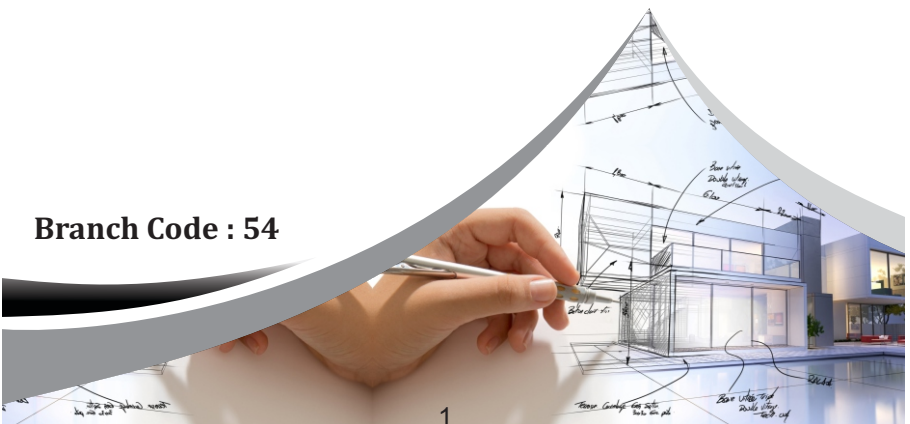


**(EVALUATION SCHEME)
III & IV SEMESTER**

**“DIPLOMA
IN
ARCHITECTURE”**

Branch Code : 54





UTTARAKHAND BOARD OF TECHNICAL EDUCATION
INSTITUTE OF RESEARCH DEVELOPMENT & TRAINING
(STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME)



BRANCH NAME: DIPLOMA IN ARCHITECTURE

SEMESTER – III

BRANCH CODE: 54

w.e.f. 2024-25

Course Code	Course Title	TH	T	P	T O T	EVALUATION SCHEME						Total Marks	Total Credit
						Internal Assessment		External Assessment					
						Theory		Theory		Practical			
						Max Marks	Max Marks	Max Marks	Duration in Hrs.	Max Marks	Duration in Hrs.		
Periods Per Week													
543001	Architectural Design-II	2	-	10	12	-	125	125	6:00	50	3:00	300	7
543002	Building Construction -II	2	1	6	9	25	25	75	2:30	25	2:30	150	5
543003	Software Application in Architecture-II	-	-	10	10	-	100	-	-	100	3:00	200	5
543004	Landscape Design & Climatology	4	-	3	7	25	10	75	2:30	30	2:30	140	6
023001	Engineering Mechanics	4	-	2	6	25	10	75	2:30	50	3:00	160	5
013054	General Proficiency#	-	-	4	4	-	25	-	-	-	-	25	1
543052	Industrial Exposure (Assessment at Inst. Level)+	-	-	-	-	-	25	-	-	-	-	25	1
	TOTAL	12	1	35	48	75	320	350	-	255	-	1000	30



UTTARAKHAND BOARD OF TECHNICAL EDUCATION
INSTITUTE OF RESEARCH DEVELOPMENT & TRAINING
(STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME)



BRANCH NAME: DIPLOMA IN ARCHITECTURE

SEMESTER – IV

BRANCH CODE: 54

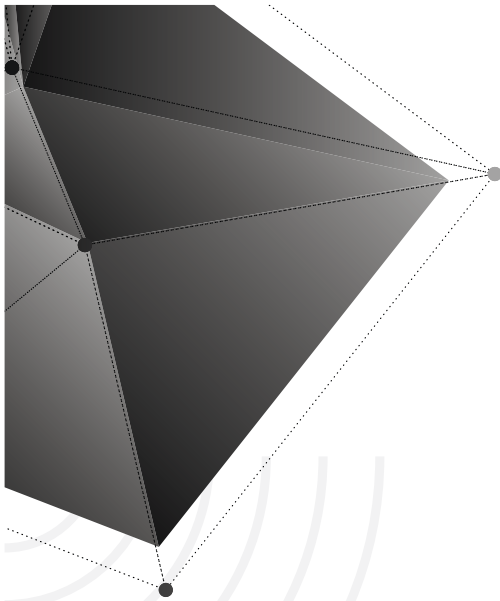
w.e.f. 2024-25

Course Code	Course Title	TH	T	P	T O T	EVALUATION SCHEME						Total Marks	Total Credit
						Internal Assessment		External Assessment					
		Periods Per Week				Theory	Practical	Theory		Practical			
		Max Marks	Max Marks	Max Marks	Duration in Hrs.	Max Marks	Duration in Hrs.						
544001	Architectural Design-III	2	-	10	12	-	125	125	7:00	50	3:00	300	7
544002	Building Construction-III	2	-	7	9	25	25	75	2:30	25	2:30	150	5
544003	Software Application in Architecture-III	-	-	10	10	-	85	-	-	100	3:00	185	5
134001	Building Services	6	-	-	6	50	-	100	2:30	-	-	150	6
024005	Mechanics of Structures	5	-	2	7	25	15	75	2:30	50	3:00	165	4
015054	General Proficiency#	-	-	4	4	-	25	-	-	-	-	25	1
544052	Industrial Exposure (Assessment at Inst. Level)+	-	-	-	-	-	25	-	-	-	-	25	1
544053	Industrial Training	Industrial training of 30 days after 4th semester would be evaluated in 5th semester through report and viva-voce.											
TOTAL		15	-	33	48	100	300	375	-	225	-	1000	29

- # General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.
- + Industrial visit compulsory at minimum 2 industries or department.
- + In each session atleast one out of station study tour / visit at architectural relevant places is compulsory.

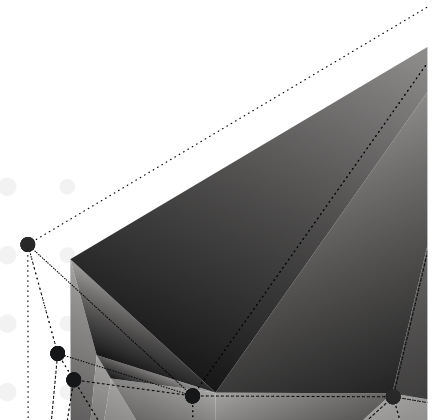
Note :-

1. Each period will be 50 minutes.
2. Each session will be of 16 weeks.
3. Effective teaching will be at least 12.5 week



THIRD SEMESTER
(Detailed Syllabus)

'DIPLOMA IN ARCHITECTURE'



ARCHITECTURAL DESIGN-II

Course Code:	543001
Course Title	Architectural Design - II
No. of Credits	7 (TH:2,T:0,P:10)

RATIONALE

Vernacular architecture refers to traditional building practices that have developed over time within specific regions or communities. It reflects the cultural identity and heritage of local people, deeply rooted in the context, history, climate, and available resources of a particular area. it embodies local resources and is created by the people, for the people.

DETAILED CONTENTS

Unit - 1 : Vernacular Architecture **27 Periods**

1. Local Case Study

- Social background
- Living pattern
- Planning and Design study
- Building materials
- Construction method
- Relevance to present time
- Report with seminar

*Study tours to relevant rural/urban destinations for primary documentation.

Unit - 2 : Design Studio

135 Periods

Detailed study of a vernacular settlement remarkable for its spatial quality, material, and construction technology, characteristic for that region & climate. Design exercise on sloping terrain with specific orientation & climatic conditions.

SUGGESTED STUDIO EXERCISES

1. Design on sloping site with unique topography of multi-story structure (G+2) like Home stay, Guest house, Motels, Hostels, Tourist complex , Ashrams etc.

Each Design project must include Site plan, Detailed all Floor plans with furniture layout, Sections, Elevations, 3-D views, Landscape plan etc.

Unit - 3 : Model Making & Seminar

30 Periods

Model making activity will be done by each student as per above using appropriate material. Model along with site topography will be produced as final output. Model should be made on scale as per drawings. The Basic materials etc. shall be supplied from the institution. The seminar be added in which the student would present his drawing in front of a jury consisting of external architects so that they may improve in expressing themselves and may get further ideas from External/Outsider Architects/Professional from an architectural institution/college. (TA and DA etc. should be provided by the institution).

REFERENCE BOOKS

1. Krishan, Arvind Climate Responsive Architecture.
2. Brown, G.Z. Sun Wind & Light.
3. Olgyay, V. Design with Climate.
4. Yeang, Ken. Designing with Nature: The Ecological basis for Architecture Design.
5. Works of Architects like Hasan Fathy, B.V. Doshi, Charles Correa, Ken Yeang, among others to understand responses of varied designers to the existing environment.

BUILDING CONSTRUCTION - II

Course Code:	543002
Course Title	Building Construction -II
No. of Credits	5 (TH:2,T:1,P:6)

RATIONALE

In the previous year, students covered the foundational aspects of the paper, including materials and construction principles. However, due to technological advancements, new materials have emerged. Understanding these materials is crucial for modern architecture. Therefore, this paper includes them to provide comprehensive knowledge.

DETAILED CONTENTS

Unit -1: Building Materials

- 1. Materials :** Properties and uses of Building materials such as:
 - Asbestos,
 - Gypsum Product,
 - Various types of Glass,
 - Various types of Building Boards (Particle Board, Fiber Board, Block Board and Ply Board laminates),
 - Plastics, Corks, Rubber,
 - Aluminum, Steel,
 - Various Flooring materials, Damp Proofing and Water Proofing Materials.
 - Different types of adhesives.

Unit - 2 : Construction Technology

2. Doors and Windows:

Study of elements of buildings such as doors and windows in metal and wood including, sliding door, rolling shutter, revolving and collapsible doors, skylights.

3. Staircases:

Glossary of terms used in stairs, Planning and layout of staircase, Different types of Staircases in R.C.C., steel and Timber.

4. Damp Proofing:

Vertical D.P.C. and Damp proofing of Basements, Roof Terraces. Special damp proofing arrangements for bathroom, W.C. and kitchen

5. Floors And Cavity Walls:

Types of floor Cement Concrete flooring, Terrazzo flooring, Timber flooring, Various types of tile flooring. Purpose of providing cavity walls, Types of cavity walls.

Note :- Class instruction is to be supplemented by studies models and visit to construction sites. The studio periods are to be devoted to preparation of detailed construction drawings of all the above building elements.

SOFTWARE APPLICATION IN ARCHITECTURE-II

Course Code:	543003
Course Title	Software Application in Architecture - II
No. of Credits	5 (TH:0,T:0,P:10)

RATIONALE

- To introduce various software to the students helping them in compilation of their text/ report etc.
- To develop an understanding of software assisting in 3-Dimensional design.

DETAILED CONTENTS

Using Google Sketch Up / 3-D MAX / Revit architecture/ Chief architect interior: Google Sketch up and related software for developing exterior and interior surfaces and spaces and creating walk-through using camera, light and assigning materials.

- a) Introduction to basic features.
- b) Introduction to modeling.
- c) Introduction to materials and mapping.
- d) Introduction of lighting. (Lighting effects & Shadow maps)

INTRODUCTION TO BASIC FEATURES

1. Introduction to SketchUp

- SketchUp for Web: requirements

- SketchUp Pro: Hardware and software requirements
- Welcome screen and templates
- Interface overview: how to navigate: title bar, menu bar, getting started toolbar, drawing area, status bar, measurements box, default panels.
- Panels menus and tools overview: How to use SketchUp tools (Quick Reference Card)
- Setting up tools panels and preferences
- Saving and reopening a model (Backing up)

2. Toolbars

3. Camera controls

- Pan
- Zoom
- orbit

4. Basic tools

- Rectangle
- Circle
- Select
- pencil
- push /pull
- Groups
- Components
- Move
- Rotate
- Copy
- Array
- Polar array

- Offset
- View
- Paint bucket

Exercise :- Making a composition of different geometrical shapes using various drawing commands.

INTRODUCTION TO MODELING

5. Modeling practice & Openings

- Walls + floor
- Windows
- Doors
- Frames
- Tables
- Chair
- Shelves
- Accessories

Exercise- Making a room having wall, floor, door, window and furniture.

INTRODUCTION TO MATERIALS AND MAPPING

6. Creating materials

- Search online for materials
- Create new material
- Edit materials
- Scale
- Rotate
- Edit

7. Warehouse

- Download models
- Edit models
- Groups vs components
- Scale

Exercise- Interior Space - Bedroom

- Room floor 20' x 20'
- Walls height 10'
- 2 doorways 7' height, 3' wide
- Window two 5' height, 4' wide or one 5' height, 8' wide

8. Section plane

- Sections - Elevations
- Floor plans

9. Layouts

- Preparing views
- Sending to layouts (Positioning, Sizing, Moving, copy)
- Using scenes
- Scale
- Dimensions
- Updating model reference
- Styles in layout
- Title block
- Shadow

10. Structures phase

- Floor
- Walls / store front
- Doorways
- Window frames
- Stairs
- Columns
- Rails

Exercise- Interior Space -

Take previous semester (Software Application in Architecture-I) Design project for developing the 3d model.

Exercise- Exterior Space

- Design a children's park

11. Creating terrain using sandbox

- Creating terrain from contours
- Modeling objects with contours
- Creating terrain from scratch
- Sculpting with the Smoove too
- Stamping and draping objects on terrain

12. Sketchup pro: importing and exporting

- Importing objects from AutoCAD
- Importing other 3D objects
- Exporting objects

Exercise- Design project with working Drawing

- **Take current semester Design project for developing 2D drawings and 3D views.**
- **Working drawing set of SITE PLAN with complete dimensioning showing plot area, covered built-up area, approach road, boundary wall with gate layout of sewage pipes, water supply pipes rain water pipes**
- **Preparation of foundation layout, section detail of foundation for brick external wall, brick internal wall, brick partition wall, brick boundary wall and RCC column.**

Note:

1. There will be only a practical exam. No theory paper of this subject.
2. Make a file on A-4 size paper.
3. Workshop to be conducted on Revit / 3 D- Max/ relevant 3 D software.

LANDSCAPE DESIGN & CLIMATOLOGY

Course Code:	543004
Course Title	Landscape Design & Climatology
No. of Credits	6 (TH:4,T:0,P:3)

RATIONALE

Sustainable landscape planning considers competing demands for land, water, and resources simultaneously. Landscape and climatology are interconnected. An integrated approach considers the complex inter linkages among different components of natural capital—land, water, and other resources

DETAILED CONTENTS

UNIT - 1 : LANDSCAPE DESIGN

1. Basics of Landscape

- i. Definition, element (natural, man-made artificial), principle, classification (hard and soft with example)
- ii. Type of plant, selection and placement:
 - a. Choose appropriate plants based on climate and soil.
 - b. Understand plant growth habits and maintenance requirements.
 - c. Arrange plants for visual impact and functionality.
- iii. Construction detail of following (sketches and scaled Plan, Section, Elevation)

- a. Paving showing material and pattern, outdoor lighting fittings and fixtures, outdoor seating, garden steps and edges, drain, fence, built-in planter, swing, water harvesting

2. landscape site analysis:

- a. Gradient and its type,
- b. Assess soil conditions, drainage, and climate.
- c. Consider existing vegetation and topography.
- d. Evaluate views, privacy, and noise factors.
- e. Zoning

3. Creating a simple landscape design base plan:

(Terrace garden or home garden)

- a. Understand the site layout.
- b. Identify existing elements (doors, windows, trees, sheds, etc.).
- c. Include boundary lines and neighboring elements.
- d. Use a north arrow to determine sun orientation

4. Parking

- Planning, layout, angle, size, circulation

Unit-2 CLIMATOLOGY

- 5. Introduction**, movement of earth around sun, element (Wind, Temperature, Humidity, Precipitation, pressure), climatic zone, orientation of building and plants w.r.to these elements, effects of climate on man and shelter

6. **Micro- macro climate** human comfort conditions, bio climatic chart
7. **Sun control and shading devices** (natural light, sun light control internal -external protection devices
8. **Basic of solar passive design**, passive solar heating and cooling)

Instructional strategy-

Effort should be made to procure audio-visual material, original, artificial plant shrubs etc. of case studies relevant to the contents of the subject. Assignments can be given in the form of file, Drawing sheet and model followed by viva voice. Field visits to FRI, local nursery etc. can be arranged

Suggested Books :-

1. landscape architecture by symonds published by mc.graw hill
2. Urban landscape design by garnett eckko published by mc.graw hill
3. Landscape design that saves energy by anne simon & mark shiller
4. Flowering trees of india and beautiful gardens by ms randhava
5. Landscape design- a practical approach by leory g. Hanaebaum

ENGINEERING MECHANICS

Course Code:	023001
Course Title	Engineering Mechanics
No. of Credits	5 (TH:4,T:0,P:2)

RATIONALE

The subject Engineering Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required by the students for further understanding of other allied subjects. The subject enhances the analytical ability of the students.

DETAILED CONTENTS

1. Introduction (08 periods)

- 1.1 Concept of engineering mechanics definition of mechanics, statics, dynamics, Application of engineering mechanics in practical fields, Definition of Engineering Mechanics.
- 1.2 Definition, basic quantities and derived quantities of basic units and derived units
- 1.3 Different systems of units (FPS, CGS, MKS and SI) and their conversion from one to another, density, force, pressure, work, power, velocity, acceleration
- 1.4 Concept of rigid body, scalar and vector quantities

2. Laws of forces (12 period)

- 2.1 Definition of force, measurement of force in SI

- units, its representation, types of Force: Point force/ concentrated force & uniformly distributed force, effects of force and characteristics of a force
- 2.2 Different force systems (coplanar and non-coplanar), principle of transmissibility Of forces, law of super-position
 - 2.3 Composition and resolution of coplanar concurrent forces, resultant force, method Of composition of forces, laws of forces, triangle law of forces, polygon law of Forces - graphically, analytically, resolution of forces, resolving a force into two Rectangular components
 - 2.4 Free body diagram
 - 2.5 Equilibrant force and its determination
 - 2.6 Lami's theorem (concept only)
[Simple problems on above topics]

3. Moment (10 period)

- 3.1 Concept of moment
- 3.2 Moment of a force and units of moment
- 3.3 Varignon's theorem (definition only)
- 3.4 Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve, reaction at support)
- 3.5 Parallel forces (like and unlike parallel force), calculating their resultant
- 3.6 Concept of couple, its properties and effects
- 3.7 General conditions of equilibrium of bodies under

coplanar forces and beams, fixed support, roller support, over hanging, Uniformly distributed load, point load, varying load

3.8 Position of resultant force by moment

[Simple problems on the above topics]

4. Centre of Gravity (08 period)

4.1 Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies

4.2 Determination of centroid of plain and composite lamina using moment method only, centroid of bodies with removed portion

4.3 Determination of center of gravity of solid bodies - cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed

[Simple problems on the above topics]

5. Moment of Inertia (06 periods)

Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections, section modulus.

6. Simple Machines (10 periods)

6.1 Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines

- 6.2 Simple and compound machine (Examples)
- 6.3 Definition of ideal machine, reversible and self locking machine
- 6.4 Effort lost in friction, Load lost in friction, determination of maximum mechanical advantage and maximum efficiency
- 6.5 System of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency
- 6.6 Working principle and application of wheel and axle, different pulley blocks, simple screw jack, worm and worm wheel, single and double winch crab. Expression for their velocity ratio and field of their application

[Simple problems on the above topics]

7. Analysis of Trusses (10 periods)

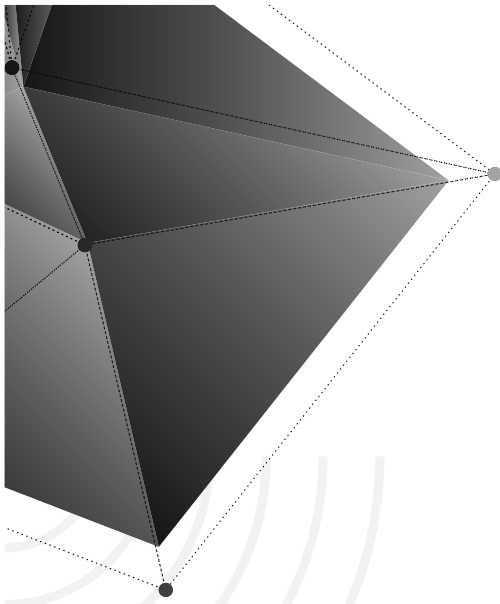
- 7.1 Concept of perfect, redundant and deficient frames
- 7.2 Assumptions and analysis of trusses by:
 - i) Method of joints
 - ii) Method of sections
 - iii) Graphical method

LIST OF PRACTICALS :

1. Verification of the following laws:
 - a) Parallelogram law of forces
 - b) Triangle law of forces
 - c) Polygon law of forces
2. To verify the forces in different members of jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the Mechanical Advantage, Velocity Ratio and efficiency in case of an inclined plane.
5. To find the Mechanical Advantage, Velocity Ratio and efficiency of a screw jack.
6. To find the Mechanical Advantage, Velocity Ratio and efficiency of worm and worm wheel.
7. To find Mechanical Advantage, Velocity Ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. Verification of forces in a framed structure.

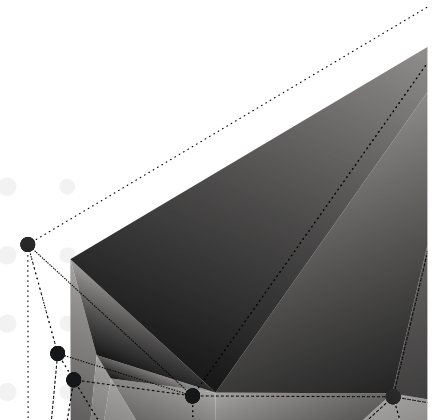
RECOMMENDED BOOKS

1. A Text Book of Applied Mechanics by S Ramamurtham, Dhanpat Rai Publishing Co. Ltd.
2. A Text Book of Engineering Mechanics (Applied Mechanics) by RK Khurmi; S Chand and Co. Ltd., New Delhi.
3. A Text Book of Applied Mechanics by RK Rajput; Laxmi Publications, New Delhi.
4. Text Book of Applied Mechanics by Birinder Singh, Kaption Publishing House, New Delhi.
5. Text Book of Applied Mechanics by C.M.Verma, JPN publication Meerut.



FOURTH SEMESTER
(Detailed Syllabus)

'DIPLOMA IN ARCHITECTURE'



ARCHITECTURAL DESIGN-III

Course Code:	544001
Course Title	Architectural Design - III
No. of Credits	7 (TH:2,T:0,P:10)

RATIONALE

The basic elements and concepts of architectural design have been dealt with in length in previous year. Now, the application of the syllabus in designing of certain category of buildings such as restaurants, clinics, schools etc. is to be dealt with in this paper. Development of out door areas.

DETAILED CONTENTS

Unit - 1: Case Study

27 Periods

- Study tours/ Case study to relevant rural/urban destinations for primary documentation followed by seminar.

Unit - 2 : Design Studio

135 Periods

I. Studio:

Studio workshop which include simple and small design problems involving horizontal/vertical circulation like small residences, clinics, nursery and primary schools, restaurants, branch post offices etc. Development of outdoor areas (work of student must be reflect the understanding of fundamentals as described in syllabus of Architectural Design I & II.)

II. Perspective & Sciography:

Perspective, Sciography and Rendering be added so that the students may submit rendered drawings and perspective drawing be prepared for at least one design.

III. Interior Schemes:

Preparing interior schemes for small residences, clinics, nursery and primary schools, restaurants, shops, sub-post office etc.

Each Design project must include Site plan, Detailed all Floor plans with furniture layout, Sections, Elevations,

3-D views, Services plan, if needed Landscape plan, working drawing set(center line plan, door window schedule, electrical, plumbing etc.)

Unit - 3 : Model Making & Seminar

30 Periods

Model making activity will be done by each student as per above using appropriate material. Model along with site topography will be produced as final output. Model should be made on scale as per drawings. The Basic materials etc. shall be supplied from the institution. The seminar be added in which the student would present his drawing in front of a jury consisting of external architects so that they may improve in expressing themselves and may get further ideas from External/Outsider Architects/Professional from an architectural institution/college. (TA and DA etc. should be provided by the institution).

NOTE:

REFERENCE BOOKS :

Study visit shall be organized and a report will be prepared for award of sessional marks. The visits shall cover Historical, Architectural and Structural aspect

1. Ching, Francis D. K. “Architecture : Form, Space and Order”, John Wiley and Sons Inc.
2. Lidwell, William, Holden, Kestina, Butler, Jill, “Universal Principles of Design”, Rockport – Publications, Massachussets.
3. “Neufert Architect’s Data”, Blackwell Publishing.
4. Donald Watson and Michael J. Crosbie, “Time – Saver Standards for Architectural Design, Technical Data for Professional Practice”, McGRAW - HILL.

BUILDING CONSTRUCTION-III

Course Code:	544002
Course Title	Building Construction - III
No. of Credits	5 (TH:2,T:0,P:7)

RATIONALE

The fundamentals of the paper has already been dealt within the previous years and the students are aware of the materials and construction principles involved. With the development of the technology, many a more materials have come up. Their use in modern architecture is inevitable so their knowledge is also vital. These materials have been given place in this paper to make the knowledge complete.

DETAILED CONTENTS

Unit - 1 : Building Materials

1. Materials:

- R.C.C. as structural material, acoustical and insulating materials,
- Finishing veneer's, cladding and paneling,
- Jali and Hollow Brick work,
- M.S. Grill work,
- Aluminium Composite Panel (ACP),
- Different types of adhesives
- Painting/Polishing material- Lime/Colour wash, Dry distemper, Oil bound distemper, Cement paints, Acrylic emulsions, Synthetic enamels, Wall texture etc.
- Polishes and Varnishes.

Unit - 2 : Construction Technology

2. Foundations:

- R.C.C. footing, Raft foundation, Pile foundation, Grillage Foundation.

3. Temporary Work:

- Timbering in trenches, Shoring, under pinning scaffolding, shuttering and form work for R.C.C., Centering for arches.

4. Roofs:

- R.C.C., Cantilevers, portico, Projections, Balcony, Treatment of expansion joints.

5. Partitions:

- Constructional details, Sustainability and uses of Brick, Wooden, Glazed, Semi-glazed partition walls, details of false ceiling and paneling in various materials.

6. Interiors:

An introduction to furniture, built-in-furniture and interior details in designing residential and commercial furniture. Modern various types of new building materials mentioned along with specifications be included from time to time as an advance study to upgrade subject. Studies with models, visits to Five-Star Hotels or similar building sites, the studio periods should be devoted to preparation of detailed construction drawings.

7. **Hardware And Construction Equipments:**

- **Hardware:** Hinges, Handles, Knobs, Bolts, L-drop, Locks, Stoppers, Stays, Silencers, Chain guards, Closers, Catchers, Knockers, etc in various materials, Patch fittings for glazed shutters.
- **Construction Equipments :** Electric Hand Tools : Vibrators, Pumps, Compactors/Rollers. Earth Moving and Excavation : Dozers, Scrapers, Graders, Shovels, Backactor, Dragline, Trenchers. Transportation : Lorries, Trucks, Dumpers, Hoist, Cranes (Moble, Static, Tower), Concrete mixers and pumps for ready mix concre.

SOFTWARE APPLICATION IN ARCHITECTURE - III

Course Code:	544003
Course Title	Software Application in Architecture-III
No. of Credits	5 (TH:0,T:0,P:10)

RATIONALE

- To introduce various software to the students helping them in compilation of their text/ report etc.
- To develop an understanding of software assisting in 3-Dimensional design.

DETAILED CONTENTS

A. INTRODUCTION TO –LUMION (Rendering)

1. Lighting phase

- Lights and settings
- Lighting with shades
- Directional lights
- Ambient lights
- General lights
- Accent lights

Exercise- Take previous semester (Software Application in Architecture-II) one BHK residence project to place lights and do Test renders

2. Render phase

- Fixing the lighting

- Importing objects- tree, human, bus, outskirts..etc.
- Editing materials
- VRay material effects
- Camera positioning
- Render settings

3. Presentation phase

- Views
- Views in SketchUP for use in Layouts
- Set up layout
- Image hierarchy
- scale
- Inserting renderings
- Dimensions and labels
- Title block

Exercise- Take previous semester (Software Application in Architecture-II) one BHK residence project to do rendering.

B. USE OF PHOTO EDITING SOFTWARE (Photoshop)

1. Getting started with Photoshop

- Digital images explained
- Get to know Photoshop

2. Working with image selections

- Selection techniques
- Modifying selections

3. Working with layers

- Creating layers
- Modifying layers
- Using type layers
- Using layer effects

4. Adjusting images

- Image modes
- Hue and saturation adjustments
- Levels adjustments

5. Retouching images

- Repairing image defects
- Removing image areas
- Painting
- Using filters

6. Resizing images

- Image resolution
- Image canvas size

7. Preparing finished images

- Image for Web use
- Image for print use
- Printing images
- Importing images

8. Photoshop for Architecture Architectural Visualisation-

Photoshop can be used to create renderings and visualisations from just a SketchUp model through photo montaging or used to provide the final touches to an externally rendered image through a post-production process very similar to an architecture photographer.

- CAD to Photoshop (SketchUp, Autodesk, AutoCAD, Solidworks and more)
- Rendered image post-production
- Placement of elements and people

9. Photoshop floor plans, elevations and sections -

Adding materials and texture to create depth and interest to 2D drawings is particularly relevant to architecture students producing elevations and sections of their work.

- Create or enhance your architectural section from 2D drawings
- Illustrating an Architectural Plan in Photoshop

10. Architecture presentation boards -

Photoshop is an excellent programme for producing architectural boards that aim to communicate design concepts, thought processes and site analysis. Again its layering system provides a very flexible and simple workflow that allows for easy annotation of site maps and photographs.

- Organize your Architectural Presentation Board
- Compose your Architectural Presentation Board

C. INTRODUCE TO USE OF PAGE MAKER

- Familiarizing the use of scanners, printers, plotters, their hardware and other related system.

Exercise-

- 1. Draft Architectural Design project in SketchUp with working drawing.**

Exercise- Design project with working Drawing

- **Take current semester Design project for developing 2D drawings and 3D views.**
- 2. Working drawing set of SITE PLAN ,Ground floor plan with dimension and specification of various building components schedule of joinery ie doors, window, ventilators etc. showing layout of sewage pipes, water supply pipes and RWP, TERRACE PLAN with rwp and over head tank**
 - 3. Do presentation Current Design project floor plans, elevation and view on Photoshop.**

Note:

1. There will be only a practical exam. No theory paper of this subject.
2. Make a file on A-4 size paper.

BUILDING SERVICES

Course Code:	134001
Course Title	Building Services
No. of Credits	6 (TH:6,T:0,P:0)

RATIONALE

This course aims at imparting knowledge to the students in the area of interior services such as plumbing system, thermal and sound insulation and electrical services.

DETAILED CONTENTS

1. Plumbing System

- a. Water supply: Hot and cold water supply system.
- b. Water distribution system.
- c. Types of pipes used in water supply.
- d. Fittings and fixtures : Wash basin, Sinks, Bath tubs, Shower cubicles, Water closets, Urinals, Bidets, Showers (overhead and telephonic), Taps (bibcock, pillar cock, angular step cock, concealed step cock and Sensor), Jacuzzis (spirlpool, turrloop, whirlpool), Mixers, Diverters, Shower panels, Saunas.
- e. Accessories: Towel ring, Toilet paper holder, Tumbler holder, Soap dish, Towel rail, Towel rack, Grab bars, Retractable clothes line.
- f. Flush valves: Concealed, Remote operated and Metropole.
- g. Storage tanks: Overhead and Underground.

- h. Geysers: Electric, Solar and Gas.
- i. Kitchen fittings: Sinks, Garbage dispensers and Chimneys.

2. Drainage

- a. Principles of drainage
- b. System of drainage: One pipe system, Two pipe system and Single stack system
- c. Traps: Introduction, Types, Function and Uses.
- d. Inspection chamber

EXERCISE- Preparation of Plumbing layout by symbolic representation based on the project carried out in interior design-II.

3. Electrical Services

- a. Wiring systems.
- c. Boxes: Electrical and junction.
- d. Modular switch boards and switches.

EXERCISE- Preparation of Electrical layout by symbolic representation based on the project carried out in interior design-II

4. Heating, Ventilation and Air-Conditioning (HVAC)

- a. Window air conditioning.
- b. Split air conditioning.
- c. Package units.
- d. Central air conditioning.

5. Vertical Transportation Systems

- a. Lifts: Introduction, Type of lift, Sizes and Safety norms.
- b. Escalators: Introduction, Uses, Sizes and Safety norms.

6. Fire-Fighting Services

- a. Introduction to causes of fire, Classification of fire hazards, Fire rating of various building materials
- b. Fire detection devices in buildings – Heat and Smoke detectors, Fire alarms.
- c. Fire fighting mechanisms and devices – Sprinkler systems, Hydrants, Wet risers etc.
- d. Controlling devices – Fire panels, Automated doors and windows, Fire doors, Vestibules etc.
- e. Building elements for fire protection: Fire escape staircases, Ramps and Elevators

7. Communication Devices

- a. Closed circuit TV
- b. EPABX
- c. FAX
- d. Computers

8. Thermal and Sound Insulation

- a. Principles of thermal insulation
- b. Heat insulating materials

- c. Acoustics: Introduction, Sound absorbent materials, Acoustical treatment
- d. Noise: Classification and Effects of noise/sound.
- e. Sound insulation: Introduction, Materials and Difference between sound insulation and sound absorption

RECOMMENDED BOOKS

1. Handbook of Designing and Installation of Services in Building Complex High Rise Buildings by VK Jain, Khanna Publishers, New Delhi.
2. Building Construction by Sushil Kumar.

MECHANICS OF STRUCTURES

Course Code:	024005
Course Title	Mechanics of Structures
No. of Credits	4 (TH:5,T:0,P:2)

RATIONALE

This is a basic engineering subject. The purpose of the subject is to impart basic knowledge and skill regarding properties of materials, concept of stresses and strains, bending moment and shear force diagrams, second moment of area, bending and shear stresses, slope and deflection. The above knowledge will be useful for designing simple structural components. This subject is very important to develop basic concepts and principles related to strength of materials. This subject will also enable the students to continue their further education.

DETAILED CONTENTS

THEORY

- 1. Properties of Materials (03 periods)**
 - 1.1 Classification of materials, elastic materials, plastic materials, ductile materials, brittle materials.
 - 1.2 Introduction to tensile test, compressive test, impact test, fatigue test, torsion test on metals.

- 2. Simple Stresses and Strains: (15 periods)**
 - 2.1 Concept of stress, normal and shear stresses,

- 2.2 Concept of strain and deformation, longitudinal and transverse strain, poisson's ratio, volumetric strain
- 2.3 Hooke's law, moduli of elasticity and rigidity, Bulk modulus of elasticity, relationship between the elastic constants.
- 2.4 Stresses and strains in bars subjected to tension and compression. Extension of uniform bar under its own weight, stress produced in compound bars (two or three) due to axial load.
- 2.5 Stress-strain diagram for mild steel and HYSD steel, mechanical properties, factor of safety.
- 2.6 Temperature stresses and strains

3. Shear Force and Bending Moment: (20 periods)

- 3.2 Types of loads (dead load, live load, snow load, wind load seismic load as per IS Codes etc) and types of loading (point, uniformly distributed and uniformly varying loads)
- 3.3 Concept of bending moment and shear force, sign conventions
- 3.4 Bending Moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to concentrated, uniformly distributed
- 3.5 Relationship between load, shear force and bending moment, point of maximum Bending moment and point of contra flexure.

4. Bending Stresses in Beams: (09 periods)

- 4.1 Concept of pure/simple bending

- 4.2 Assumptions made in the theory of simple bending, derivation and application of bending equation to circular cross-section, I section, T&L sections only
- 4.3 Moment of resistance
- 4.4 Calculations of bending stresses in simply supported beam

5. Combined Direct and Bending Stresses: (10 periods)

- 5.1 Concentric and eccentric loads single axis eccentricity only
- 5.2 Effect of eccentric load on the section stresses due to eccentric loads, Numerical in the case of short columns.
- 5.3 Simple problems on stability of masonry dams and retaining walls

6. Shear Stresses in Beams (07 periods)

- 6.1 Concept of shear stresses in beams, shear stress distribution in rectangular, circular I, T, L sections (Formula to be stated, no derivation)

7. Slope and Deflection (10 periods)

Necessity for determination of slope and deflection
Moment area theorem (no derivation, numerical problems)

8. Columns (06 periods)

- 8.1 Theory of columns
- 8.2 Euler's and Rankine Formula (No derivation)

PRACTICAL EXERCISES :

- i) Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of young's modulus on mild steel
- ii) Testing of HYSD Steel
- iii) Determination of Young's modulus of elasticity for steel wire with searl's apparatus
- iv) Determination of modulus of rupture of a concrete beam
- v) Determination of maximum deflection and young's modulus of elasticity in simply supported beam with load at middle third poin

INSTRUCTIONAL STRATEGY

Teachers are expected to give simple exercises involving the applications of various concepts and principles being taught in the subject. Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve tutorial sheets independently. In the practical works, individual students should be given opportunities to do practical work, make observations and draw conclusions. Teachers should also conduct viva examination in which stress should be given on the understanding of basic concepts and principles.

RECOMMENDED BOOKS

- i) Mechanics & Material by Kirpal Singh, Standard Publication, New Delhi
- ii) Ramamrutham, S., "Strength of Materials", Dhanpat Rai and Sons., New Delhi
- iii) Ram Chandra, "Applied Mechanics and Strength of Materials", Standard Publishers. Delhi:
- iv) Punmia, BC., "Strength of Materials", Standard Publishers, Delhi,
- v) Prasad VS “ Structural mechanics Galgotia publications Pvt Ltd, Delhi
- vi) Sadhu Singh “Strengths of Materials” Standard Publishers, New Delhi
- vii) Singh Birinder “Structural Mechanics” Kaption Publishers, Ludhiana
- viii) Singh Harbhajan, “ Structural Mechanics” ., Abhishek Publishers, Chandigarh
- ix) Singh Harbhajan, “Design of Masonry and Timber Structures” Abhishek Publishers, Chandigarh.
- x) SOM by C.M.Verma, J.P.N. Publication
