

Uttarakhand Technical University
Dehradun
Faculty of Architecture

B. ARCH. (Secon year) SEMESTER - IV
AR – 401 ARCHITECTURAL DESIGN - IV

Schedule of Teaching and Examination

L	P/TV	ST	TOTAL	S	T	P/V	TOTAL
1	-	8	9	100	100	50	250

Examination Duration

6X2=12 Hours

OBJECTIVES

- To understand and to apply the principles of architectural composition (organized physical structure) in design.
- Use of appropriate presentation techniques to explain the contents of design.
- Developing drawing. Graphic and model making and oral presentation skills.

CONTENTS

Understanding relationship of human scale, activity, space and form in mono – functional buildings. Suggested studio exercises : Creative design of simple buildings such as Community halls, Restaurants. College, Canteens, Reading rooms etc.

Functional, Geometric and visual order of repetitive units. Suggested studio exercises : Design of buildings having primarily horizontal circulation and repetitive units such as nursery and primary school. Motels. way-side tourist areades and kiosks.

Note : The studio exercise in addition to the above should also have at least one time problem as a preparation for the examination.

APPROACH :

Lectures with slide and field visit on similar design. Models to supplement each stage of development of design for greater understanding of Stress on working in the studios and referencing in Library.

Note : The subject will be taught by at least one teacher for every 20 students.

NOT FOR CONDUCT OF EXAMINATIONS

The duration of Examination for this subject is 6X2=12 hours. The Examination shall be held over two days. The Drawing completed on the first day shall be left in the examination hall and shall be completed and submitted on the second day.

B. ARCH. (Second year) SEMESTER - IV
AR – 402 CONSTRUCTION & MATERIALS - IV

Schedule of Teaching and Examination

L	P/TV	ST	TOTAL	S	T	P/V	TOTAL
1	-	6	7	100	50	50	200

Examination Duration

3 Hours

OBJECTIVES

- To Introduce and familiarize the students with constituents. manufacturing process / availability.
- Properties/characteristics, defects, classification and uses of building materials used in construction.
- To understand the use of these building materials in building works.

CONTENTS

MATERIALS

Timber Products	:	Decorative and Commercial Plywood. Ply- Board, Block Boards, Particle Boards, Wood Wool Cement Board. Fiber Board, Compressed Straw Board, Veneers, Laminates, Cement Fibre Board.
Roof Coverings	:	Clay Tiles (Country, Allahabad, Mangalore tiles etc.). Concrete Tiles, Asbestos Cement sheets (Plain & Corrugated), Aluminium Sheets (Plain & Corrugated). Galvanised Iron Sheets (Plain & Corrugated). Stone, Slating, Shingles, Thatch.
Adhesives	:	Introduction, Natural Adhesives – Animal, Cassin, Bituminous, Thermoplastic Adhesives – Polyvinyl Acetate.

CONSTRUCION

Roofs & Trusses (Timber)	:	Terminology, Single roof, Double or Purlin roof, Trussed rafter roof. Triple or Framed roof.
Partition, Cladding & Panelling	:	Terminology, Timber and Timber Products, Clay and Terracotta Brick & Block. Pre- cast Concrete Block, Wood Wool Cement, Compressed Straw Board, Glass and Glass Brick.
Doors & Windows(Timber)	:	Sliding Door, Sliding – folding door & Revolving Doors.

APPROACH :

The students would be familiarized with vernacular terminology prevalent in this part of the country. The emphasis will be on construction details as applicable to Indian conditions. Site visits and market surveys will be integral part of sessional work.

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B. ARCH. (Second year) SEMESTER - IV
AR – 403 ARCHITECTURAL STRUCTURES - IV

Schedule of Teaching and Examination

L	P/TV	ST	TOTAL	S	T	P/V	TOTAL
2	2	-	4	50	50	-	100

Examination Duration

3 Hours

OBJECTIVES

- To understand the masonry design.
- To understand the reinforcement cement concrete design of structural elements.

CONTENTS

Materials For Concrete	:	Introduction, cement, Aggregate, Water, Admixture, Tests on materials, Measurements of materials, Mixing, placing, compaction & curing.
Design Philosophies	:	Introduction, Working stress method, Ultimate load method. Limit State method, Limit state method Vs working Stress method, Building code.
Definitions	:	Introduction, Limit state, Characteristic strength, and characteristic load, Design values, partial safety factors Factored loads, Stress-strain relationship for concrete Stress-strain relationship for steel. Yields stress.
Singly Reinforced Beams	:	Introduction, Bending of beam Assumpuons, Moment of resistance, Modes of failure, maximum depth of neutral axis, Limiting values of tensions steel and moment of resistance, minimum and maximum tensions reinforcement , Effective span, Type of problem, Design tables.
Doubly Reinforcement Beams	:	Introduction, Type of problem, Stress in compression reinforcement, design steps, Minimum and maximum reinforcement, Design tables.
Flanged Beams	:	Introduction, Effective width of flange, minimum and maximum reinforcement.
Shear & Development Length	:	Introduction, She ar stress, Diagonal tension Shear reinforcement, Development length, Anchorage bend, Flexural bond.
Detailing of Reinforcement	:	Introduction, Requirements of good detailing, Cover to reinforcement, Spacing of reinforcement, Reinforcement requirements, Reinforcement splieing.
Slabs	:	Introduction, One way slab. Two way slab.
Masonry Structures	:	Introduction, Masonry wall, Design of wall & columns.
Foundation	:	Isolated column footings, Strip footings, Brick masonry wall and column footing design.

APPROACH: The lectures by the experts in the fields will be arranged followed by the nomal examples.

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B. ARCH. (Second year) SEMESTER - IV
AR – 404 HISTORY OF ARCHITECTURE- II

Schedule of Teaching and Examination

L	P/TV	ST	TOTAL	S	T	P/V	TOTAL
2	1	-	3	50	50	-	100

Examination Duration

3 Hours

OBJECTIVES

- Understanding of the period in terms of its location, climate as well as the socio-cultural, historical, economic and political influences of the time.
- Study of the building types and the development of architectural form and character based on the developments in construction and technology exemplified through specific building examples that identify the works of the period.
- Understanding the intentions of the period and architects as a solution to the need or demands of the period.

CONTENTS

Introduction	:	Introduction and understanding of Islam's philosophy and its interpretation in building type e.g. mosque. tomb. Fort and their elements like domes, minarets, arch. Squinch etc.
The Sultanate Style	:	With reference to the slave, khalji, tughlaq, sayyid, lodhis and shershan suri regimes (who ruled from Delhi) and their architecture.
Provincial Architecture	:	Development of colloquial styles in various provinces of India like Punjab, Jaunpur, Gujarat, Bengal, Bijapur, Bihar and Deccan.
Cities and Citadels	:	Morphology of fortified cities of Jaisalmer, fort palaces like Mandu, Chittorgarh, Orchha, Datia, Jodhpur etc with an overview on architectural types like havelis, stepwells, gates, baradaris etc.
Mughal Architecture	:	The architecture of the Timurids in India- Babur, Hamayun, Akhbar, Jahangir and Shahjahan.
The later moghuls	:	The Oudh architecture in Lucknow and its surroundings briefly outlining the Lucknow city.
Colonial Architecture	:	The British architecture of the colonial days in India the capitol at Delhi and the residency at Lucknow emphasizing on their planning criteria and architectural features.

APPROACH :

- Lectures to be specifically conducted with the visual aids and seminars presented by students
- Students will make written assignments and seminar presentations on architectural

----- and identify the building types and the movements of the period responsible for
and time.

- Students will make free-hand sketches and orthographic drawings in the of specific building examples to familiarize them with the architectural character that identifies the work of a particular period.
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B. ARCH. (Second year) SEMESTER - IV
AR – 405 CLIMATOLOGY

Schedule of Teaching and Examination

L	P/TV	ST	TOTAL	S	T	P/V	TOTAL
1	1	-	2	50	50	-	100

Examination Duration

3 Hours

OBJECTIVES

- To acquaint the students about human thermal comfort as an essential function of a building and its analysis and use in Architecture.

CONTENTS

Introduction to Climate	:	Importance of climate in Architecture, Factors affecting climate, Elements of climate, Solar radiation, Temperature, Wind, Humidity and precipitation and their measurement.
Tropical Climate	:	Climatic zones, characteristics of tropical climate, Macroclimate and Microclimate.
Human Thermal Comfort	:	Study of body's heat production and heat loss, Comfort zone, Bioclimate chart and effective temperature, Isopleths.
Shading Devices	:	Method of recording position of sun in relation to earth Solar chart, Shadow angle protractor and its application in designing of shading devices.
Day Light	:	Natural lighting, Glare, day light factor and day lighting in tropics.
Ventilation and Air-movement	:	Requirement size and position of openings, Air-flow pattern inside and outside buildings.
Orientation	:	Orientation of buildings in relation to sun and wind.

APPROACH:

- Course would be covered through lectures.
- Tutorials for Practical designing of sunshades louvers to be carried out in studio and through case studies.

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B. ARCH. (Second year) SEMESTER - IV
AR – 406 Building Services (Water Supply)

Schedule of Teaching and Examination

L	P/T	ST	TOTAL	S	T	P/V	TOTAL
1	2	3		50	50		100

Examination Duration

3 Hours

OBJECTIVES

- To understand the basic principles of water supply and sanitation.
- To make them enable to draw the piping system (pipe above ground and under ground) for different types of buildings.
- To familiarize the student with plumbing bye laws as per ISI.

CONTENTS

Water Supply

1. Need to protect water supply and requirements of water supply to different types of buildings.
2. Sources of water supply. quantity and quality of water and treatment of plants.
3. Conveyance of distribution of water overhead tank under ground tanks pipe appurtenances.
4. Hot and cold water supply system in a low rise and high rise buildings. distribution system in campus. Pipes their sizes. Jointing and different fittings.

Sanitary Engineering

1. Purpose and principles of sanitation. Collection and conveyance of waste water.
2. Quantity and quality of refuse. Design and construction of sewer's and sewer appurtenances. Roof and surface water drainage.
3. Sanitary appliances. Traps their variety. Pipes and joints. Sanitary pipes works below and above ground level. Drainage in non-municipal area.
4. Rain waters storage and water harvesting principles and methods.

System of plumbing and plumbing Bye-Laws

1. The water supply and sanitary system individual and group of buildings.
2. Indian standards for designing the toilet, kitchen.
3. Plumbing by- laws.

APPROACH :-

1. The emphasis will be on the studio exercise on designing and detailing water supply and drainage in a building toilet and kitchens.
2. The student shall be motivated to visit the practical site.

B. ARCH. (Second year) SEMESTER - IV

AR – 407 Computer Application to Architecture

Schedule of Teaching and Examination

L	P/T	ST	TOTAL	S	T	P/V	TOTAL
1	2	-	3	50	-	50	100

Examination Duration

Hours

Objectives

To develop an understanding of the design based software like Auto Cad, Coral Draw and Adobe Photoshop. Learning the application of these software in design exercises so as to make use of maximum commands.

Contents

Understanding AutoCAD

- Learn various 2D commands their function and application
- Understanding coordinate systems
- Working on layers and Colours
- Drawing plans, Elevations, sections using AutoCAD
- Dimensioning Drawings.
- Connecting from one file format to another
- Various File Formats and their usefulness

Understanding Coral Draw

- Learn various commands their functions and application
- Putting text and images together in various settings.
- Importing and exporting documents
- Learn various commands and their functions and applications

Suggested Exercises

- Drawing the entire set of drawings form an already designed residence using AutoCAD
- Design and draw a logo with the help of Coral Draw including Textures and Colours. (May be use if as a letter Head.)