Uttarakhand Tech. University, Dehradun
Faculty of Architecture

B. ARCH. (Fourth Year) SEMESTER – VI
AR – 601 ARCHITECTURAL DESIGN – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	-	8	9	100	100	50	250	2x6 Hours

OBJECTIVES

- Design for the requirements of individuals, groups or community with limited land size and other parameters
- Designing for simple and multi-use, single and multiple floors with parameters of building byelaws

CONTENTS

Residential : Residential buildings for defined clients and given requirements on specific

Non-Residential : Designing for unknown users, the buildings other than residential uses e.g., middle order education buildings, commercial and health-care facilities etc.

Suggested studio exercise :
Detached, semi-detached houses, terraced housing and Group housing. Housing for specific socio-economic groups, schools, neighborhood shopping centers, commercial banks polyclinics/diagnostic centers

APPROACH

- Prototype case-studies may be done in groups of 3-5 students.
- Slide lectures on similar projects.
- Understanding to develop the design requirements/ Architectural programe.
- Design time problems programs to prepare students for examinations.

Uttarakhand Tech. University, Dehradun
Faculty of Architecture

B. ARCH. (Fourth Year) SEMESTER – VI
AR – 602 CONTRUCTION & MATERIAL – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	-	6	7	100	50	50	200	3 Hours

OBJECTIVES

- To introduce and familiarize the students with constituents, manufacturing process/ availability, properties/ characteristics, defects, classifications, treatments, preservation and uses of traditional building materials used in construction.
- To understand the use of these traditional materials in simple building works.

CONTENTS : **Materials**

Ceramics	:	Terracotta, Faience, Fireclay, Stoneware, Earthen ware, Vitreous China, Porcelain. Jointing and Finishing.
Metals	:	Non ferrous – copper & copper based alloys (brass & bronze), tin, cadmium, chromium, zinc, lead, nickel.
Plastics	:	Thermoplastics – Polythene, Polyvinyl chloride, Polyvinyl acetate, Poly-propylene, Polymethyl metha Crylate, Polystyrene, Acrylo-nitrile butadiene styrene, Nylon, Polycarbonate. Thermosetting Plastics-Polyster resin, Polyurethane, Synthetic resin, Rubber.

CONSTRUCTION

R.C.C. (Formwork & Laying)	:	***Foundations :*** isolated, combined, cantilever, eccentric footing, grillage and raft foundation. Pile foundations-details of pile, varieties of piles, pile caps, Beams, Columns, Lintel, column grid and frame constructor. Slabs-simply supported & cantilevered. Slabs-simply supported & cantilevered.
Water proofing	:	Vertical water proofing : Basement Expansion joints
Temporary Construction	:	Centering, Shuttering, Scaffolding.
Doors & Windows (Metal)	:	Metal – Rolling Shutter, Collapsible Shutter, Gate, Grill and Railings. P.V.C. – Doors and Windows.

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.
- Understanding to develop the design requirements/ Architectural programe.
- Site visits and market surveys will be integral part of sessional work.

Uttarakhand Tech. University, Dehradun
Faculty of Architecture

B. ARCH. (Fourth Year) SEMESTER – VI
AR – 603 ARCHITECTURAL STRUCTURES – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
2	2	-	4	50	-	50	100	3 Hours

OBJECTIVES

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

CONTENTS

Overview of construction materials	:	Cement, aggregate, water, reinforcement
Concrete used in R.C.C	:	Grades of concrete, workability & durability, Design Mix & Nominal Mix.
General Design Consideration for Beams, Slabs & Columns	:	Effective depth of beams & slabs, Control of deflection for beams & slabs. Effective length and slenderness limits for columns.
Requirement of Joints in R.C.C. Construction	:	Construction Joints, Expansion Joints.
Requirements governing Reinforcement & Detailing	:	Development of stress in reinforcement, spacing of reinforcement. Requirement of reinforcement e.g. maximum & minimum tension & compression reinforcement for beams, spacing of shear reinforcement, side face reinforcement fro beams. Reinforcement of min. & max. reinforcement for columns, spacing of ties in columns, min. reinforcement for slabs, Requirement of cover for beams, columns, slabs.
Design of Beams	:	Simply supported & continuous beams.
Design of Slabs	:	One way & two way slabs.
Design of stairs	:	Effective span of stairs, distribution of loading on stairs, simple case of design of stairs

APPROACH

- The lectures by the experts in the fields will be arranged to make the students do independent design of structural elements.

Uttarakhand Tech. University, Dehradun
Faculty of Architecture

B. ARCH. (Fourth Year) SEMESTER – VI
AR – 604 THEORY OF DESIGN – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	2	-	3	50	50	-	100	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 different buildings and the development of architectura form and character based on 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

Picturesque and Neo-Classical Architecture: Purity and structural honesty of antiquity preferred over ornamentation and exaggeration of Baroque. Representation of ancient Roman monuments in imaginary compositions. Archeological purism and importance of pictorial values in historical settings. Recreation of antique Roman simplicity and splendor for modern living. Study of important palaces and public buildings in Britain and France.

Enlightenment and beginnings of Modern : Belief in creation of 'new' and 'ideal' world through return to fundamentals, 'true' and 'original' values. Romanticizing elementary geometrical forms with undecorated surfaces. Iron and glass construction for openness and lightness. Art Nouveau. Repetitive, orthogonal, skeletal systems for horizontal and vertical expansion. Later attempts to dissociate reference to past styles.

Modern Architecture : Social intentions and search for ideal world. Pluralism in place of past unity of styles. Search for paradigms in a historical sources : return to fundamentals and origins in geometry, nature and paradigms of technology. Simplicity, abstraction, non-objective, non-representative and neglect of content and ornament. Expressions of construction and technology. Equating technology and progress with present. Functionalism and functional appropriateness. Thoughts and works Frank Lloyd Wright, Walter Gropius, Le Corbusier, Mies vander Rohe, Alvar Aalto, Louis Kahn, Dutch De Stijl, Italian Futurists and Russian Constructivists. International Style. Oversimplification of the Modern Movement into functional, steel and glass, cubes. Monotonous functionalist abstractions and Modernism as a style.
Disenchantment of Modern cities and fall of Modern Movement.

Post Modern Architecture : Post Modern Architecture as a revision of Modern Architecture and resistance to functional containers of 60's. Objective, representational and emphasis on content. Pluralistic and differing trends.

Post Modern Historicism : Rooted to place and history. Regard for expression : ornament, symbolism and context with irony and humour, exemplified through the works of James Stirling, Michael Graves, Charles Moore, Arata Isozaki.

Neo-Modern : Disregard historical imagery to recapture ideals of Modern architecture of 20's. Hi-Tech metal abstractions of Ricard Rogers, Norman Foster, showing structure and equipment as implied ornament. References to Russian Constructivists. The early works of New York Five including later works of Richard Mier as complicated, exaggerated and sophisticated revival of the Modern grid and Corbusier's geometry. Synthesis of Hi-Tech and Historicism in the works Aldo Rossi, Mario Botta, Cesar Pelli.

Deconstructivism:

- Lectures to be specifically conducted with the visual aids and seminars presented by students.
- Student will make written assignments and seminars presentations on architectural characteristics that identify the building types and the intentions of the period in response to context and time.
- Students will make free hand sketches and orthographic Drawing in the tutorials of specific building examples to familiarize them with the architectural character that identifies the work of a particular period.

Uttarakhand Tech. University, Dehradun
Faculty of Architecture

B. ARCH. (Fourth Year) SEMESTER – VI
AR – 605 SPECIFICATIONS & ESTIMATION – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	2	-	3	50	50	-	100	3 Hours

OBJECTIVES

- To initiate the students into theory and practice of estimation and quantity surveying.
- To develop the understanding of specification writing.

CONTENTS

Specification : Definition, Importance and scope of the subject. Correct form of writing specifications, avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and uses of standard specification viz; drafted by C.P.W.D. etc.
Writing detailed specifications for various building constructions works e.g. earthwork for foundations, concreting the trenches for foundations, superstructure in cement mortar, R.B. work, plastering and painting, lime punning, flooring, whitewashing, distempering and painting. Snoweem wash, stone masonry, mud phuska, terracing and others.

Estimating : Estimates-types of estimates-approximate and detailed methods of estimating – plinth area method, carpet/ floor area method cubic content method, approximate quantity method and number system, detail estimates procedure of estimating, taking out quantities schedule of rates.
Exercise in estimating (with different methods) of small buildings, estimating exercises for interior schemes, plumbing work and electrical installations etc.

Rate analysis : Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works, e.g. earthwork for foundations, flooring, timber work etc.
Introduction to P.W.D. accounts procedure, measurement book, daily labour, muster roll, stores, stock, and issue of material from stock, indent form, imprest account, cash book, mode of payment.

APPROACH

- The course would be covered through lectures and tutorials.
- The students seminars will help realize the grasp on the subject matter.

Uttarakhand Tech. University, Dehradun
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B. ARCH. (Fourth Year) SEMESTER – VI
AR – 606 MECHNICAL SERVICES – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	-	2	3	50	50	-	100	3 Hours

OBJECTIVES

- To develop an understanding of the advanced building services such as Air-conditioning, Lifts and their application and, the Fire protection in the design proposals of buildings of slight complex nature such as multistoried buildings. The stress shall be on understanding the use and application of the services and not so much on the calculation or numerical part.

CONTENTS

Air Conditioning Systems :
-Principles of Air-conditioning
-Psychometric chart
-Refrigeration Cycle and the air cycle
-Comfort Cycle systems – Unitary air conditioning and remote air-conditioning
- working of window air conditioners and central air-conditioning their parts and the standards and prescribed locations for the respective parts
-Air Distribution Systems-fans, filters, ductwork, outlets, dampers,
- Norms for Air-conditioning
- Cooling load for air conditioning

Note: The emphasis shall be on educating the student as to how the system works and the location of various distribution systems such as the AH, cooling plant cooling tower FCU and duets.

Lift Services :
- Types of Lifts
- working of lifts with details of lift section describing various parts of lifts
- Definitions regarding lifts such as average travel, lift carrying capacity, rated load, rated speed, RTT etc.
- Installation requirements and the information to be provided by the architect for the installation
- Grouping of lifts and design standards of a lift lobby.
- Function and working of Escalators.

Note : The emphasis shall be on the drawing of the correct plan and section of the lift and the lift well showing various parts and how to group them in a building core for the various functions they perform.

Fire Protection :
-Causes and spread of fire, Fire detection equipments, Fire extinguishers and other fire fighting equipments, Methods of firefighting.
- Combustibility of materials and fire resistance
- Means of escape, fire doors, water curtains etc.
- Code of Safety prescribed in National Building Code

APPROACH

- Specialized lectures from technical people in the field.
- Practical and site based exercises to make the data more comprehensive.

Uttarakhand Tech. University, Dehradun
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B. ARCH. (Fourth Year) SEMESTER – VI
AR – 607 Working Drawing & Bye - Laws – VI

Schedule of Teaching and Examination								Examination Duration
L	**P/TV**	**ST**	**TOTAL**	**S**	**T**	**P/V**	**TOTAL**	
1	-	3	4	50	-	50	100	3 Hours

OBJECTIVES

- To understand design limitations due to authority guidelines and making drawing/ details necessary for final execution of a project.

CONTENTS :

- Familiarizing with Building Bye-laws through Local Developments Authority Guidelines, Understanding the concepts related to ground coverage and setbacks, FAR, light-plane and building heights, and interpretation of the bye-laws as applicable to residential buildings in plotted developments, Group Housings, Commercial Buildings, Educational Buildings and other Public Institutions. Safety measures like fire protecton, seismic considerations and other provisions of National Building Code.
- Preparation of complete Local Development Authority drawing for a small two storied building that may have been designed in any of the previous semester. The drawings to also incorporate electrical and pluming details complete with schedule and all specifications. The Working Drawing and details to include :

1. Site plan
2. Foundation layout with details of foundations.
3. All floor plans.
4. All elevations.
5. Sections
6. Doors and Windows schedule and details
7. Electrical Layout in at least one of the two Floors
8. Plumbing Layout in at least one of the two Floors
9. Details of toilet and Kitchen etc. complete with all fixtures and their specifications.
10. Flooring pattern
11. Staircases Details
12. Details of Grills, Parapet of railings
13. Typical wall section showing foundation, DPC, skirting, sill, lintel, slab and terracing details.

METHODOLOGY

- Course would be covered through lectures
- Regular studio work for total grasp.