



**5-Year Bachelor of Architecture (B.Arch.) Curriculum and
Syllabus
Fifth Semester**

Course Code	Course Title	Contact Hrs. / Week			Credit
		L	S	P	
Theory					
TIUACE - 501	Design of Structures - I	3	0	0	3
TIUAME - 501	Mechanical Services	2	0	0	2
TIUAR- 501	Contemporary Architecture I	3	0	0	3
TIUAR- 502	Estimation & Specification	2	0	0	2
Practical					
TIUAR- 503	Estimation Practice	0	0	3	2
TIUAR- 504	Educational Tour	0	0	0	2
TIUAR/E-505A/B	Architectural Journalism & Photography OR Film/Theatre Set Designing	0	0	2	1
Sessional					
TIUAR- 506	Architectural Design - IV	0	12	0	8
TIUAR- 507	Working Drawing - I	2	8	0	4
Institute Programme					
TIUSD- 501	Career Advancement & Skill Development	3	0	0	3
TIUFY- 5##	Entrepreneurship Skill Development	0	0	0	2
Total Credits					32



DESIGN OF STRUCTURES (TIU## - 5##)

L – S – P (3 – 0 – 0)

Credits-3

Course Objective:

- To classify various types of RCC material depending upon the strength and durability parameter
- To design a beam for a given system of loading and structural geometry, for flexure and shear
- To design a slab for given building floor for different end support conditions
- To design a column for given axial load and moments
- To design a dogleg staircase for given stair well space in residential or public building
- To outline the features of IS code provisions regarding limit state method for designing concrete structure
- To summaries the conceptual idea behind the development of pre-stressed structural component for general use

MODULE I

Basic Material Properties & Design Concept

Introduction to Concrete Technology, Composition of Concrete and the properties, Strength and Durability, Modulus of Rupture, Creep and Shrinkage of Concrete, Reinforcing Bars, Types and grade, Stress-Strain Diagram of Steel and Concrete. Concrete Mix Design: Nominal Mix and Design Mix. Design Philosophies, Working Stress Method, Limit State Method, Various Limit States.

MODULE II

Design for Flexure

Introduction, assumption, flexure design of singly reinforced & doubly reinforced and T-beams by Limit State Methods. IS-Coded provisions, Numerical Problems.

MODULE III

Design for Shear, Bond

Shear failure of beams. Shear reinforcement, Curtailment of reinforcement. Bond, Anchorage and Development length, IS-Code provisions, Design of a beam with flexural and shear consideration. Reinforcement Detailing, Numerical Problems.

MODULE IV

Design of Compression Members

Short and Long Columns, IS-Code Provisions, Design of Short Columns under Axial compression, Design of Columns under bi-axial bending, use of interaction diagram for design. Lateral ties. Reinforcement Detailing, Numerical Problems.

MODULE V

Design of Footing

Isolated footings for rectangular and circular columns. Reinforcement Detailing, Numerical Problems.

MODULE VI

Design of Slabs & Stairs

Effective span, one way and two way slabs. Design of Slabs with various boundary conditions by IS-Code methods. Reinforcement Detailing, Numerical Problems. Types of stairs, Design of Dog Legged & Open Wall Stairs. Reinforcement Detailing, Numerical Problems.



MODULE VII

Introduction to Pre-stressed Concrete

Introduction to Pre-stressed Concrete, Pre and Post tensioning systems, Advantages, Basic design concept of Pre-stressed concrete beam, Analysis of prestress and bending stress, Resultant Stress, Thrust Line, Concept of Load balancing, Various losses of stresses. Simple Numerical Problems

IS Codes:

1. IS 465: 2000.
2. SP-16
3. SP-34

Note:

1. *All the Design of Concrete Structural Elements must be based on "Limit State Method"*
2. *Students are allowed to bring IS 465: 2000 and SP-16 in the examination hall for referring the design solutions.*

Recommended Books:

1. B. C. Punmia; *Reinforced concrete structure (Vol - I)*.
2. S. Unnikrishna Pillai & Devdas Menon; *Reinforcement Concrete Design, Tata McGraw Hill, New Delhi*.
3. N.Krishna Raju; *Structural Design and Drawing, Reinforced Concrete and Steel, University Press (India) Ltd.*
4. Mallick and Gupta; *Reinforced Concrete*.
5. P.C.Varghese; *Limit State Design of Reinforced Concrete Structures*.
6. James R. Libby, *Prestressed Concrete Design and Construction, The Ronald Press Company*.
7. N.Krishna Raju; *Prestressed Concrete, Tata McGraw Hill, New Delhi*.



MECHANICAL SERVICES (TIU##- 5##)

L – S – P (2 – 0 – 0)

Credits-2

Objectives:

- To differentiate between Natural Ventilation and Mechanical Ventilation.
- To identify the factors responsible for comfort conditions.
- To define the different Psychrometric Processes.
- To identify the factors responsible for cooling load calculation.
- To classify different types of Air Conditioning systems and their suitability for different psychrometric conditions.
- To identify different Air Conditioning equipments and their suitable location in buildings.
- To explain the function of mechanical equipments for vertical transportation (elevators and escalators for buildings).
- To explain the different fire fighting methods to be adopted in buildings.
- To plan buildings as per the fire safety norms.

MODULE I

Introduction –

- Mechanical Services required in Buildings
- Role of an Architect regarding mechanical Services.
- The scope and impact of Mechanical system- Impact of space planning
- Impact on Architectural Design
- Impact on High rise Bldg
- Impact on construction cost
- Impact on Global environment

MODULE II

Mechanical Ventilation –

- Standard requirements of ventilation for different conditions of living and works.
- Conditions for comfort
- Control of quality, quantity, temperature and humidity of air.

MODULE III

Psychrometry-

Introduction, meaning of air conditioning, different psychrometric properties, psychrometric processes, Psychrometric chart & its application summer air conditioning system, winter air conditioning system, year round air conditioning system

MODULE IV

Principles of refrigeration & Air -Conditioning

- Different types of Air-Conditioning.
- Cooling load Calculation

MODULE V

Air Conditioning Equipments -

- Major equipment used in Air conditioning - their characteristics & suitable place for location, consideration for reduction of heat gain and economic layout of supply and return air ducts.
- Schematic drawings showing the Air conditioning system of an office building, hotel, auditorium etc.



MODULE VI

Mechanical Equipments for vertical transportation – Building design and vertical transportation, Demand for vertical transportation

- Lift and Escalators: types, uses, functioning, automatic control system.
- Plans & sections to explain different parts of lifts and escalators.
- Planning for vertical transportation

MODULE VII

Fire Safety

- Role and Importance, Fire safety design, planning for fire protection.
- Fire detection & fire fighting
- Different fire fighting methods to be adopted in buildings.

Recommended Books:

1. Arora & Duinkand,; –Text book of Refrigeration & Air conditioning|
2. Architectural Graphic Standard (HVAC System)
3. National Building code.
4. William.K.Y.Tao; –Mechanical and electrical Systems in Buildings|
5. V.P.Lang,| Principles of air conditioning|
6. Rodney R.Alder ;|Vertical Transportation for Building|



CONTEMPORARY ARCHITECTURE I(TIAR - 501)

L – S – P (3 – 0 – 0)

Credits-3

MODULE I

Introduction : Advent of Steel , glass and Ferro-concrete

- Late Renaissance and development of open spaces
- Advent of Steel and Henry Labrouste
- Great Exhibitions of 1851 and 1889 and their contributions
- Gustave Eiffel
- Development of Ferro concrete: Auguste Perret, Tony Garnier

MODULE II

Development of 'New Art & Architecture'

- Le Art Nouveau movement and Victor Horta
- H.P. Berlage, H. H. Richardson and 'True Construction'
- Balloon Frame Structure and Plane Surfaces in America

MODULE III

Chicago School & Organic Developments

- Chicago School: Louis Sullivan
- Organic Architecture: Frank Lloyd Wright

MODULE IV

Programmatic Functionalism

- Walter Gropius and Bauhaus
- Le Corbusier

MODULE V

Development of International Style

- Mies van der Rohe
- Philip Johnson
- Louis I Kahn

MODULE VI

20th Century World Architecture

- Works of some master architects like, Eero Saarinen,,Alvar Aalto, Oscar Niemeyer, Richard Neutra, Norman Foster, Antonio Gaudi, Frank O. Gehry, I. M. Pei, Kenzo Tange.

MODULE VII

Indian Architecture since Independence

- B. V. Doshi
- Charles Correa
- Raj Rewal
- A. P. Kanvinde
- Laurie Baker

Recommended Books:

1. Sigfried Giedion ; Space, time and Architecture.
2. Vincent Scully Jr; Modern Architecture.
3. Vikram Bhatt and Peter Sciver; After the masters (Contemporary Architecture of India).



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4. Kenneth Frampton; Modern Architecture.
5. Library of Contemporary Architects



ESTIMATION & SPECIFICATION (TIUAR -502)

L – S – P (2 – 0 – 0)

Credits-2

Course Objective:

- To differentiate between the general specification and detailed specification.
- To write the detailed specification of different items of work
- To define different types of estimates and their suitability to different types of works.
- To distinguish between the approximate estimates and the detailed estimate
- To identify the different units of measurement for different items of work.
- To calculate the quantity of different items of work using various methods of estimating.
- To calculate the rate for different items of work
- To classify different types of tenders/contracts
- To prepare BOQ for item rate contract

MODULE I

GENERAL SPECIFICATION & TYPES OF CONTRACT.

- Definition of specification, need of the specification.
- General specification and Detailed Specification
- Types of Tender / contract and the reflection in BOQ.
- Writing Items for BOQ for Item rate contract.
- Definition of -Building estimate
- Purpose of Estimating.
- Different Types of Estimate.

MODULE II

APPROXIMATE ESTIMATE

- Importance & purpose of Approximate / Rough estimation
- Different methods of approximate estimate.

MODULE III

DETAILED ESTIMATE.

- Preparation of Detailed estimate.
- Function of -Measurement forml & -Abstract of estimate forml.
- Description & significance of Item in BOQ.

MODULE IV

METHODS OF MEASUREMENT OF WORKS.

- Different methods of estimating building works.
- Estimation of a simple building at different stages:
 - a) Foundation up to plinth
 - b) Superstructure
 - c) Finishing works

MODULE V

REINFORCEMENT QUANTITIES FOR RC WORKS.

- Calculation of quantity for Reinforced concrete(RC) for: Column, Lintel, Slab & Beam.

MODULE VI

ANALYSIS OF RATE & QUANTITY OF MATERIALS.

- Purpose of Rate analysis.
- Quantity of Materials.



- Different components of rate

Recommended Books:

1. M. Chakraborty; Estimating, Costing, Specification & Valuation
2. B.N. Dutta; Estimating & Costing
3. D.D.Kohli & R.C.Kohli ; A Text Book of Estimating and Costing

ESTIMATION PRACTICE (TIUAR - 503)

L – S – P (0 – 0 – 3)

Credits-2

Estimation of the residence, designed in Architectural design- Soft and hard copy of the detailed estimation using PWD SOR has to be prepared.



EDUCATIONAL TOUR (TIUAR - 504)

L – S – P (0 – 0 – 0)

Credits-2

1. Study of historic precincts/buildings, landscape and building interiors.
2. Documentation through mapping, hand-sketching, preparation of measured drawings and detailed-drawings, report writing and photography.
3. The tour would be for 7-10 days.

The students are required to prepare a report based on the Educational Tour, which will develop the skills and methods of report writing. This will be supported by presentations in sheets, drawings, sketches, photographs and in electronic media.

Report should include the following:

6. The duration of the trip, the itinerary, the places visited, the number of pupil and teachers accompanying them.
7. The specific places, the important monuments, their description, historic background, architectural styles, present status, structural systems, special or notable features and an architectural unbiased criticism.
8. The people, societal framework, economical status, density, traditions and culture of the place/region.
9. Environment, natural flora and fauna, and manmade interventions- urban scape and its specific features, problems.
10. Summary: New things learnt questions that remained unsolved, conclusion.

The measured drawing conducted during the tour, will be presented as well drafted drawings by the students. It should be hand drafted and rendered and all the methods for proper documentation of the structure measured will be considered in the presentation.

This will follow a seminar, where the students will present their work verbally.

Viva voce

Final Viva-vice on all the design assignments to be conducted at the end of the semester



ARCHITECTURAL JOURNALISM & PHOTOGRAPHY (TIUAR/E – 505A)

L – S – P (0 – 0 – 2)

Credits-1

MODULE I

INTRODUCTION TO PHOTOGRAPHY

General introduction to the art of photography, concept of color, concepts of lighting, distance, visual angle, frames, media

MODULE II

PHOTOGRAPHIC TECHNIQUES

Types of camera, properties and priorities; Exposure, Aperture, Speed; Photographic films, Film processing color, black and white, printing techniques, developing.

MODULE III

JOURNALISM

Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics; discursive techniques, analysis of major critical themes, thematic categories in architectural writing over the past three centuries.

MODULE IV

ANALYSIS OF WORKS

Works of Indian and international writers and critics will be presented and discussed.
Seminars on Indian architectural writers, journalists and critics

MODULE V

FIELD PROGRAM

Exercise on integrating photography in architectural journalism.

Recommended Books:

1. Dave Saunders, Professional Advertising Photography, Merchurst, London 1988
2. Roger Hicks, Practical photography, Cassell, London 1996
3. Julian Calder and John Garrett, The 35mm Photographer's Handbook, Pan Books, London 1999
4. Julie Adair King, Digital Photography for Dummies, COMDEX, New Delhi 1998



FILM/THEATRE SET DESIGNING (TIUAR/E – 505B)

L – S – P (0 – 0 – 2)

Credits-1

PURPOSE

- To create awareness and provide exposure about the design potential in theatre and cinema set design to architecture students.

INSTRUCTIONAL OBJECTIVES

- To inculcate the ability to translate the requirements of the script to physical manifestations according to the traditions followed in the theatre and cinema industry.

MODULE I

FILM AND SOCIETY

Examination of the twentieth-century culture and society through film. Critical analysis of cultural and social conflicts are portrayed and worked out in popular films, and examination of how motion pictures create a window into modern society. Film as cultural texts to better understand history and culture manifestations.

MODULE II

HISTORY AND THEATER FILM SET DESIGN 6

Investigation the production methods, dramatic theory and conventions, and scene design of various performance media since the popularization of the motion picture, and how it has influenced all entertainment design in the 20th and 21st centuries.

MODULE III

GRAPHIC DESIGN AND TYPOGRAPHY FOR EXHIBIT DESIGN

Principles of layout for creating effective visual signage and explore the unique problems, technique, theory, and approaches of signage in film, theatre, and other forms of mediated exhibition. Introduction to the design applications for building signage.

MODULE IV

SET DESIGN AND CONCEPT WRAP

Introduction to the basic concepts, through theory and practice, of scene design in theatre, film, and other fine arts and entertainment media. Students will learn how to analyze scripts for proper scenery, how to conceptualize designs that will translate into actual sets, and develop visual thinking within the creative process.

MODULE V

STAGE DESIGN

Stage design process from inception to performance, script analysis, visual arts analysis, research skills, and the application of principles and elements of design. Understanding stage setting through language, color, and architectural analysis.

Recommended Books:

1. Time saver standards for building types, DeChiara and Callender, Mc Graw hill company
2. Neufert Architect's data, Bousmaha Baiche & Nicholas Walliman, Blackwell science ltd



ARCHITECTURAL DESIGN-IV (TIUAR - 506)

L – S – P (0 – 12 – 0)

Credits-8

Objectives:

- Application of Design theory and principles and
- Design of Low rise / medium rise /high rise buildings with complex issues to be tackled
covering functional relationship, climatic condition, social aspects along with structural considerations and building services
- Application and use of relevant building bye-laws and provisions of **National Building Code**

MODULE I

Commercial–cum- Residential complex (high rise)

MODULE II

Town Hall & Civic Centre/ Resort

MODULE III

Exhibition Pavilion / Country Club house/ Museum

Design (Time) Exercise

Any one of the above, not covered in the class 8 hrs.



WORKING DRAWING I (TIUAR - 507)

L – S – P (2 – 8 – 0)

Credits-4

Objectives

- Explanation and demonstration of basics in working drawing study of process and Symbols of working drawings.
 - Building construction drawings to be prepared as a part of contract document with proper Labelling and dimensioning techniques.
 - Working drawing to be made of one building in a complex chosen from earlier design
 - Projects carried out in the 4th semester.
 - Prerequisites: BMC sessionals, Architectural detailing
1. Layout plan of the whole complex and excavation plan of one Building
 2. Foundation plan
 3. Ground floor plan along with schedule of internal finishes
 4. Upper floor plans along with schedule of internal finishes
 5. Terrace/ roof plan including roof drainage
 6. All 2 side elevation with labelling of one building
 7. External finishes of all types included in the complex; the drawings
 8. Shall include all details required.
 9. Minimum 3 sections including one through staircase and toilets and
 10. One skin section showing required detailing.
 11. Door window schedule to be prepared for the undertaken building.

Minimum of 11 sheets to be done in the semester.