



# NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI - 620015

## DEPARTMENT OF ARCHITECTURE

### SYLLABUS FOR WRITTEN TEST

#### **History & Theory of Architecture**

Factors shaping the architectural character of a region; Egyptian architecture; Greek architecture; Roman architecture; Early Christian architecture; Byzantine architecture; Islamic architecture; Hindu architecture – Dravidian style; Christian architecture – Romanesque, Gothic, and Renaissance architecture; Mughal and Colonial architecture in India; Modern architecture and art movements.

Architectural theory in historical perspective – deterministic methods and models; concept of creativity; visual design principles; organic architecture and contemporary movements in architecture; design process and design approaches.

#### **Building Materials, Construction & Management**

Foundations; masonry construction; stone and brick masonry; composite walls and cavity walls; arch construction; roof trusses and roof coverings; RCC slabs over walls; reinforcement detailing; doors, windows, and ventilators; floors and flooring; partitions; vertical transportation; long-span and lightweight construction; space structures in steel and concrete; cladding systems; false ceilings and wall panelling; mud wall construction; repair and retrofitting of structures.

Basics of structural mechanics; load transfer systems; RCC, steel, and timber structural systems; earthquake-resistant construction and seismic design principles.

Fire protection and fire-resistant design of buildings.

Construction planning and project management – bar charts and activity charts; resource levelling; network planning methods; critical path method; probabilistic techniques; concepts of uncertainty; optimization techniques and optimization models.

#### **Surveying & Site Planning**

Importance of site analysis and factors involved; accessibility; size and shape of sites; conforming and non-conforming uses; climate and topography; infrastructure availability; sources of water supply and methods of waste disposal; architectural and visual aspects; preparation of site analysis diagrams; lie of the land; contours; watershed; surface drainage; ayacuts and irrigation lands.

Site planning principles; grading and drainage; orientation and climatic considerations in site planning.

## **Building Services**

Estimation of water supply; sources of water and treatment processes; plumbing fixtures and hydrant systems; water distribution systems; specialized services; waste classification; solid waste management; drainage; wastewater treatment techniques.

Design criteria for sound in various architectural spaces; noise criteria curves; acoustical problems; behaviour of sound in enclosed spaces; principles of geometrical acoustics; Sabine's formula and its interpretation; auditorium acoustics; design criteria for speech and music; acoustic design for reverberation control.

Wiring systems; service connections; distribution systems in houses; laws of illumination; different types of lamps and their properties; criteria and standards of illumination for various activity areas.

Basics of heat transfer and thermodynamic principles; psychrometric properties and human comfort parameters; fundamentals of air-conditioning load estimation; systems of air conditioning.

## **Energy Efficient & Sustainable Architecture**

Passive heating concepts; passive cooling concepts; passive heating and cooling strategies; classification and functions of ventilation; factors to be considered for integrating natural ventilation in building design, IEQ Concepts.

Climate-responsive architecture; sun path and shading devices; daylighting strategies; thermal performance of buildings; ECBC guidelines; thermal comfort and indoor environmental quality.

Wind speed – terrain and height correction techniques; calculation of airflow through openings due to wind pressure; calculation of probable indoor wind speed as recommended by the Bureau of Indian Standards; wind speeds and thermal comfort.

Sustainable building materials; green building concepts; net-zero energy buildings; embodied energy and carbon footprint; green building rating systems such as GRIHA, LEED, and IGBC.

## **Housing**

Public and private sector housing; need for housing policy; role of HUDCO and State Housing Boards; slums – definitions, causes, and consequences; attempts made to solve slum-related problems.

Low-cost housing – methods of controlling housing costs; low-cost construction techniques and materials adopted in India and other developing countries.

## **Urban Design, Landscape & Conservation**

Historical and modern examples of urban design; elements of the urban built environment – urban form, spaces, structure, pattern, fabric, texture, grain, etc.; concepts and theories of urban design; principles, tools, and techniques of urban design.

Public spaces, character, spatial qualities, and sense of place; urban design interventions for sustainable development and transportation; development controls – FAR, densities, and building bye-laws; transit-oriented development (TOD); smart cities and urban resilience.

Urban renewal and conservation; heritage conservation; historical public spaces and gardens; landscape design; site planning.

### **Planning Techniques & Management**

Application of GIS and Remote Sensing techniques in urban and regional planning; tools and techniques of surveys – physical, topographical, land use, and socio-economic surveys.

Urban economics; law of demand and supply of land and its application in planning; graphic presentation of spatial data; local self-governance and Panchayati Raj institutions; planning legislation and implementation – Land Acquisition Act, PPP, etc.

Decision support systems and land information systems; urban geography and econometrics; management of infrastructure projects; demography and equity in planning; master planning; zoning principles.

### **Digital Architecture & Emerging Technologies**

Building Information Modelling (BIM); parametric and computational design; smart buildings; digital fabrication basics; artificial intelligence applications in architecture and planning.

### **Professional Practice, Building Codes & Regulations**

Building bye-laws; National Building Code (NBC); development control regulations; accessibility standards; fire safety regulations; professional practice; contracts and tendering procedures; specifications; role of statutory bodies and professional ethics.