UNIT 1
Architectural Research:

UNIT 2
THEORY OF ARCHITECTURE & DESIGN
1. Theory in Antiquity: Marcus Vitruvius
2. Theory in Renaissance: architects of French Academic Tradition
3. 18th Century and 19th Century theories: ideas & concepts
4. Modern movement theory post industrial revolution
5. Postmodern movement theories
7. Architectural Criticism: Wayne Attoe
8. Contemporary Significant Theory: Archigram, Paolo Soleri, Kenzo Tange, Moshe Safdie etc.

UNIT 3
HISTORY OF ARCHITECTURE
1. Architecture of prehistoric times and river Valley civilizations.
2. Indian Temple architecture - Dravidian and Indo-Aryan styles
4. Islamic architecture (central Asia, west Asia and India)
5. Colonial Architecture in India.
6. Modern and Postmodern Architecture of Europe and America.

UNIT 4
HUMANITIES & SOCIAL SCIENCES
1. Definition of Sociology; Nature, Scope and Utility of Sociology; Branches of Sociology; Relation of Sociology and its branches to architecture and the built environment.
2. Biosocial and Sociocultural associations; Definitions of sociological terms: society, community, family, culture; Difference between society and community; Relation between culture and built form
3. Urban and Rural Communities: Definitions of the terms “urban” and “rural”. Relation and interdependencies between urban and rural settlements.
4. Effects of urbanization on rural areas. Impact of growing urbanization on urban life, viz. health, housing, transportation. Different types of migration. The impact of migration on urban form.
5. Social Research: The need for research; the research process; ethics of social research; scope of social research. Difference between methodology and methods. Types of research methods: qualitative, quantitative, mixed research methods. Sources of research data: primary and secondary sources.
8. Economic organization of society. Economic systems - capitalism; socialism, communism, mixed-economies. Primary, secondary and tertiary sectors of economy: agriculture, mining, manufacturing,
banking, marketing, transport and service sectors. Factors of production: land, labour, capital and entrepreneurship.

UNIT 5
CLIMATOLOGY AND SUSTAINABILITY
5. Sustainability concepts- natural and renewable resources, conservation of energy, Sustainable site development, site layout, Storm water design, Alternative transportation, Urban heat islands
7. Site & building energy utilization: Onsite renewable energy, Buildings performance Indoor environmental quality, Efficiency, Green buildings, Application of solar passive design in architecture suitable to regional climates
8. Air quality daylight & Rating systems: Indoor air quality management, optimization of Daylight, Rating systems, GRIHA and LEED systems.

UNIT 6
METHODS OF CONSTRUCTION
1. Brick and stone as a building material, types of brick and stone masonry walls and bonds
2. Types of Wooden Doors, Wooden glazed windows, Timber Roof
3. RCC Foundations, types of Staircases and construction methods, RCC Slabs: one-way, two-way slabs, cantilever slabs, sloping RCC roof, Vaults & Domes
4. Floor finishes including Toilet flooring, Advanced RCC roofs: Flat slab, Flat plate, Filler slabs, Waffle slab. RCC filler Slabs
5. Construction of steel trusses for various spans, Pre-engineered building, shell roof, geodesic domes, space frame, pneumatic structures, Frameless glass doors and windows,
6. Structural Glazing and cladding, Metal cladding of facades and building envelopes
7. UPVC, PVC & FRP: Doors and windows, Steel sliding and folding doors and partitions.

UNIT 7
MATERIALS OF CONSTRUCTION
1. Wood as a building Material: defects, seasoning and preservation of timber
2. Cement and Steel as a Building material, Concrete: grades of concrete, production of concrete, mix, proportioning, Vaults & domes
3. Marble, granite, mosaic, terrazzo, ceramic tiles
4. Paints, varnishes and distempers, emulsions, cement based paints
5. Structural steel: Types, properties, uses
6. Aluminum as a building Material
7. Plastic, types, properties and uses of plastics, construction chemicals and additives, Alternative wall technologies, Sandwich panel walls, PUF panels.

UNIT 8
BUILDING SERVICES
(A) PUBLIC HEALTH & ENGINEERING
- Introduction to environment and health aspects, the history of sanitation and health and hygiene.
- Water supply systems - the various sources, the quantity and quality of water required for various uses, water treatment systems, storage and pumping and distribution of water, schematic diagrams for various applications.
- Sewerage systems – Assessment of sewage generated, the collection and conveyance of sewage, types of sewage treatment, the space and ventilation required for STP, the MOC (materials of construction) of sewerage network.
- Storm water management – Rainwater harvesting system, assessment and quantification, drainage system, collection and reuse of water within a project.
- Plumbing – Water supply systems for hot, cold & flushing systems, drainage - floor traps, MOC, various control valves, pipe supports, hangers, fixing and plumbing of small houses.
- Sanitary Fixtures, Fittings & Wellness – Various products available and their application.
- Solid waste management – Waste segregation, treatment and disposal
- Special requirements – solar hot water generation, Central LPG system, Medical gases supply, storage of High-Speed Diesel, Central Vacuum & Waste collection

(B) ELECTRICAL SERVICES & ILLUMINATION
- Electrical services generation, supply, transmission & Distribution – commonly used terminology, standards & codes, various sources and transmission & distribution system
- Internal electrical distribution system – load calculation and systems and distribution for various building typology
- renewable energy systems – onsite and off-site generation, concept of net zero building, energy conservation techniques in electrical systems
- Electrical services protection systems - switchgear and various protection devices, earthing and lightning protection systems.
- Illumination – Quality and quantity of lighting, lux levels and various types of lighting fixtures, integration with natural lighting and laws of illumination. Lighting methods, systems of luminaries and preparation of lighting layout
- Extra low voltage system – Telephone, data & Cable TV networking and service provider requirement.
- Electrical layout design and load estimation - electrical layout design using symbols as per IS codes and electrical load calculations.

(C) HEATING VENTILATION & AIRCONDITIONING, MECHANICAL TRANSPORTATION & FIRE PROTECTION
- Introduction to Mechanical ventilation – Need, types of systems & application.
- Introduction to air conditioning – Definition, psychometrics processes, refrigeration cycles, basics of load calculation, zoning and air distribution, heating systems
- Air-conditioning systems – various systems, the components of various systems, basics of duct sizing and routing, preferred location of equipment and architectural requirements.
- Specialized systems – clean rooms, server, hub & UPS rooms, OT
- Mechanical transportation systems in buildings – Elevators, Types, design considerations, Quality & Quantity of elevators, architectural requirements, safety devices, finishes, location and arrangement of elevators.
- Escalators & Travellators – Application, calculation of traffic capacity, inclination factor, location and arrangement
- Fire Safety in buildings Passive protection – Classification of Fire, causes and hazards, classification of buildings as per NBC, combustible & noncombustible materials, Concepts of passive protection through escape routes, stairs, fire refuge areas, pressurization, travel distance, fire tower, compartmentation, fire signages etc
- Active Fire Control – Firefighting installations, fire sprinklers, fire hydrants, automatic fire detection and alarm systems
- Rules of fire safety for high rise buildings
(D) ACOUSTICS & NOISE CONTROL

● Introduction to sound & room acoustics - origin and nature of sound, its characteristics & measurements, inverse square law, human hearing and auditory range for humans, pitch, tone & loudness, reflection from various surfaces, reverberation time calculation using Sabine’s & Eyring’s formulae, effect of RT on speech & music.

● Acoustical tools & measurements – Use of SLM, AI, STI, sound attenuation, absorption coefficients of acoustical materials, NRC value, NC Curves for various spaces.

● Acoustical materials, Acoustical design & detailing of Auditoriums, and other spaces

● Introduction to environmental noise control – noise source and classification, noise transmission, maximum acceptable noise levels, reduction at source, reduction near source etc.

● Constructional measures of noise control and sound insulation – enclosures, sound insulation, sound isolation, vibration isolation etc

● Industrial noise – impact, friction, methods of reduction by enclosures & barriers

● Introduction to Urban soundscape – Noise reduction and control by site planning, town and regional planning consideration, sustainable building strategies in building acoustics, role of architects in shaping the urban soundscape.

UNIT 9

STRUCTURES

1. Mechanics: Concept of Force, Concept of particle and rigid body. Concurrent, Non-Concurrent and parallel forces in a plane, moment of force, free body diagram, conditions of equilibrium, Principle of virtual work, equivalent force system.


3. Design of Structures as per I.S. Codes:
   a) Structural Steel: Factors of safety and load factors. Riveted, bolted and welded joints and connections. Design of tension and compression member, beams of built up section, stanchions with battens and lacings.
   b) Reinforced Concrete: Concept of mix design. Working Stress and Limit State method of design–Recommendations of I.S. codes, Types of Slabs & Beams, Design of one way and two way slabs, staircase slabs, simple and continuous beams of rectangular, T and L sections. Compression members under direct load with or without eccentricity, Types of Footings shallow, deep and distribution of load to soil
   c) Pre-stressed concrete: Methods and systems of prestressing, anchorages, Analysis and design of sections for flexure based on working stress, loss of prestress.
   d) Brick masonry, Long Span Structures & High Rise Structures: Design requirements and analysis due to lateral loads.

4. Cost Effective Housing Techniques:
   a) Development and adoption of low cost housing technology,
   b) Alternative building materials for low cost housing & Low cost Infrastructure services: Ferro cement, Gypsum boards, Timber substitutions, Industrial wastes, Agricultural wastes.


UNIT 10
DESIGN IN URBAN CONTEXT

1. Methods of Observation
   a. Drawing (sketching, diagramming, documenting / measured drawing, etc)
   b. Collating digital information (through mobile and data usage)
   c. 3D Scanners and other digital means
   d. Surveys

2. Layers of Information
   a. Civic structure (public and private space, hierarchy, etc.)
   b. Physical Infrastructure (buildings, roads, etc.)
   c. Social aspects (gender, caste, age, etc.)
   d. Cultural aspects (memory, symbolism, value, equity, etc.)
   e. Time (in terms of the physical age and in terms of passage through areas within)
   f. Local and city governance (introduction to the agencies concerned and their ambit)
   g. Climate and its impact
   h. Services (incl. waste management) and their integration within the context
   i. Transportation (Private and public) systems

3. Assimilation of Information
   a. Integration of all observations to develop an approach to speculation.
   c. The place of abstract notions of artifice, kinetics, abstraction, simultaneity in the way one responds.

UNIT 11
LANDSCAPE ARCHITECTURE & SITE PLANNING

1. Mughal Gardens
2. Japanese Gardens
3. English Gardens – Concept & Philosophy
4. Terminologies used in Landscape like alley, ha ha fence, topiary, etc
5. Hardscapes and soft-scapes – components like trees, shrubs, grasses, ground covers and their role
6. Site planning based on natural factors like topography, soils, geology, flora and fauna, hydrology and physiography

REFERENCES


Additional Reading:

9. Introduction to Scientology Ethics, Hubbard, L. Ron. New Era Publisher, Denmark.

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