GATE Syllabus
Architecture and Planning

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ARCHITECTURE AND PLANNING

Subject Code: AR

Course Structure

<table>
<thead>
<tr>
<th>Sections/Units</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A</td>
<td>Architecture and Design</td>
</tr>
<tr>
<td>Section B</td>
<td>Building Materials, Construction and Management</td>
</tr>
<tr>
<td>Section C</td>
<td>Building and Structures</td>
</tr>
<tr>
<td>Section D</td>
<td>Environmental Planning and Design</td>
</tr>
<tr>
<td>Section E</td>
<td>Urban Design</td>
</tr>
<tr>
<td>Section F</td>
<td>Urban Planning and Housing</td>
</tr>
<tr>
<td>Section G</td>
<td>Planning Techniques and Management</td>
</tr>
<tr>
<td>Section H</td>
<td>Services, Infrastructure and Transportation</td>
</tr>
</tbody>
</table>

Course Syllabus

Section A: Architecture and Design

- Visual composition in 2D and 3D
- Principles of Art and Architecture
- Organization of space
- Architectural Graphics
- Computer Graphics – concepts of CAD, BIM, 3D modeling and Architectural rendition
- Programming languages and automation.
- Anthropometrics
- Planning and design considerations for different building types;
- Site planning
- Circulation- horizontal and vertical
- Barrier free design
- Space Standards
- Building Codes
- National Building Code
- Elements, construction, architectural styles and examples of different periods of:
  - Indian and Western History of Architecture
  - Oriental, Vernacular and Traditional architecture
  - Architectural developments since Industrial Revolution
  - Influence of modern art on architecture
  - Art nouveau, Eclecticism, International styles, Post Modernism, Deconstruction in architecture
  - Recent trends in Contemporary Architecture
  - Works of renowned national and international architects

Section B: Building Materials, Construction and Management
- Behavioral characteristics and applications of different building materials viz. mud, timber, bamboo, brick, concrete, steel, glass, FRP, AAC, different polymers, composites
- Building construction techniques, methods and details
- Building systems and prefabrication of building elements
- Principles of Modular Coordination, estimation, specification, valuation, professional practice
- Construction planning and equipment
- Project management techniques e.g. PERT, CPM etc.

Section C: Building and Structures
- Principles of strength of materials
- Design of structural elements in wood, steel and RCC
- Elastic and Limit State design
- Structural systems in RCC and Steel
- Form and Structure
- Principles of Pre-stressing
- High Rise and Long Span structures, gravity and lateral load resisting systems
- Principles and design of disaster resistant structures

Section D: Environmental Planning and Design
- Ecosystem- natural and man-made ecosystem
- Ecological principles
- Concepts of Environmental Impact Analysis
- Environmental considerations in planning and design
- Thermal comfort, ventilation and air movement
- Principles of lighting and illumination
- Climate responsive design
- Solar architecture
- Principles of architectural acoustics
- Green Building- Concepts and Rating
- ECBC
- Building Performance Simulation and Evaluation
- Environmental pollution- types, causes, controls and abatement strategies

Section E: Urban Design
- Concepts and theories of urban design
- Public Perception
- Townscape
- Public Realm
- Urban design interventions for sustainable development and transportation
- Historical and modern examples of urban design
- Public spaces, character, spatial qualities and Sense of Place
- Elements of urban built environment – urban form, spaces, structure, pattern, fabric, texture, grain etc
- Principles, tools and techniques of urban design
- Urban renewal and conservation
- Site planning
- Landscape design
- Development controls – FAR, densities and building bye laws

Section F: Urban Planning and Housing

Planning process
- Types of plans:
  - Master Plan
  - City Development Plan
  - Structure
- Plan:
  - Zonal Plan
  - Action Area Plan
  - Town Planning Scheme
  - Regional Plan
Salient concepts:
- Theories and principles of urban planning
- Sustainable urban development
- Emerging concepts of cities:
  - Eco-City
  - Smart City
  - Transit Oriented
- Development (TOD), SEZ, SRZ etc.

Housing
- Concepts
- Principles and examples of neighbourhood
- Housing typologies
- Slums
- Affordable Housing
- Housing for special areas and needs
- Residential
- Densities
- Standards for housing and community facilities
- National Housing Policies, Programs and Schemes

Section G: Planning Techniques and Management

Planning Techniques
- Tools and techniques of Surveys:
  - Physical
  - Topographical
  - Land use
  - Socioeconomic Surveys
- Methods of non-spatial and spatial data analysis
- Graphic presentation of spatial data
- Application of G.I.S. and Remote Sensing techniques in urban and regional planning
- Decision support system and Land Information System

Management
- Urban Economics
- Law of demand and supply of land and its use in planning
- Social, Economic and environmental cost benefit analysis
- Techniques of financial appraisal
- Management of Infrastructure Projects
- Development guidelines such as URDPFI
Planning Legislation and implementation – Land Acquisition Act, PPP etc.
Local self-governance

Section H: Services, Infrastructure and Transportation

Building Services
- Water supply
- Sewerage and drainage systems
- Sanitary fittings and fixtures
- Plumbing systems
- Principles of internal and external drainage system
- Principles of electrification of buildings
- Intelligent Buildings
- Elevators and Escalators - standards and uses
- Air-Conditioning systems
- Firefighting Systems
- Building Safety and Security systems

Urban Infrastructure
- Transportation
- Water Supply
- Sewerage
- Drainage
- Solid
- Waste Management
- Electricity
- Communications

Process and Principles of Transportation Planning and Traffic Engineering
- Road capacity
- Traffic survey methods
- Traffic flow characteristics
- Traffic analyses and design considerations
- Travel demand forecasting
- Land-use – transportation - urban form inter-relationships Design of roads, intersections, grade separators and parking areas
- Hierarchy of roads and level of service
- Traffic and transport management and control in urban areas
➢ Mass transportation planning
➢ Paratransit and other modes of transportation
➢ Pedestrian and slow moving traffic planning
➢ Intelligent Transportation Systems

**Principles of water supply and sanitation systems**

➢ Water treatment
➢ Water supply and distribution system
➢ Water harvesting systems
➢ Principles, Planning and Design of storm water drainage system
➢ Sewage disposal methods
➢ Methods of solid waste management:
  • Collection
  • Transportation
  • Disposal
➢ Recycling and Reuse of solid waste
➢ Power Supply and Communication Systems, network, design and guidelines