

# **BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI**

## **DEPARTMENT OF ARCHITECTURE**

### **1. AREAS FOR PHD PROGRAM IN ARCHITECTURE AND URBAN PLANNING:**

1. Sustainability and Energy Efficient Architecture;
2. Architectural Education;
3. Urban Design
4. Urban and Regional Planning;
5. Urban Infrastructure Planning;

### **2. (A) BROAD SYLLABUS FOR WRITTEN ENTRANCE TEST IN PHD PROGRAMME IN ARCHITECTURE**

#### **Environmental Science & Building Science**

1. INTRODUCTION: Climate and Weather, Elements of Climate, Classification of tropical climates, Climate balanced Architecture
2. BIO-CLIMATIC APPROACH: Human Comfort, Thermal Comfort Factors, Bioclimatic Requirements, Relation of climatic elements to comfort, The Bio-Climatic Chart
3. ENVIRONMENT AND BUILDING FORMS: Impact of External forces on Building
4. SITE & BUILDING DESIGN: Site Selection, Site Planning, Building Orientation and Placement, Effect of Landscaping
5. SUN & BUILDING DESIGN: Basic Principles of Heat Transfer, Daylighting, Solar Control, Thermal Insulation
6. WIND & BUILDING DESIGN: Wind effect and Air Flow Pattern, Ventilation Techniques, Air movement around the buildings, Stack Effect and Thermally induced air currents.
7. ARCHITECTURAL APPLICATION: Shelter for warm-humid climates, Shelter for hot-dry climates, Shelter for composite climate

#### **Urban Design**

1. Early examples of Urban Design in classical and pre-industrial cities – Heritage and the roots of our modern concepts in urban design.
2. Objectives and scope of urban design, Basic functions, principles and techniques. Value enhancement, aesthetics and conservation aspects.
3. Surveys in Urban Areas, Scale in Urban design, urban mass, perceiving & mapping a city, Urban Space. Urban activity & circulation. Examples at regional, metropolitan, Urban and project level.
4. Designing the parts of city - central areas, the town center, civic spaces, shopping centers, Industrial Areas and estates. Residential areas & Housing.
5. Techniques of Urban Design with emphasis on public policies, conservation and economic considerations, Road forms, serial, grid-iron, Hierarchy of access routes - Pedestrian areas and malls & Urban elements.

6. Legal aspects with respect to Land Acquisition Act and Town Planning acts - financing for Project realization – Agencies involved in the execution – coordinating role of planning authorities. Working of Urban Arts commission.
7. Planning and Design parameters for New towns

## **Building Services**

### **Sustainable Architecture**

1. Concept of Sustainability – Carrying capacity, sustainable development – Bruntland report – Ethics and Visions of sustainability.
2. Eco system and food chain, natural cycles – Ecological foot print – Climate change and Sustainability.
3. Selection of materials Eco building materials and construction – Biomimicry, Low impact construction and recyclable products and embodied energy. Life cycle analysis. Energy sources – Renewable and non-renewable energy.
4. Green building design – Rating system – LEED, GRIHA, BREEAM etc., case studies. 5. Urban ecology, social and economic dimensions of sustainability, urban heat Island effects, sustainable communities – Case studies

## **2. (B) BROAD SYLLABUS FOR WRITTEN ENTRANCE TEST IN PHD PROGRAMME IN URBAN PLANNING**

### **Principles of Human Settlements**

1. Relevance of evolution of human settlements in modern context. Historic determinants, settlement types: ancient, medieval, renaissance and industrial age.
2. Origin and evolution of planning: Impacts of Industrial revolution on town planning and regional planning. Contemporary developments in planning in India, formation of metropolitan areas, socio-economic impacts of growth of population, rural-urban migration.
3. Contributions of Ebenezer Howard, Patrick Geddes, Tony Garnier, Lewis Mumford, Le-Corbusier and others in planning.
4. The fundamental problems of the city; changes with time and growth; technological, social and other changes in size and scale.
5. Physical nature and characteristics of the urban environment and its components; Land uses, physical structure and relationship between parts of city. Land use planning information system.
6. Models of the planning process, Goals of land policy, the interim and comprehensive plans: Structure Plan, Master Plan, Zonal Development Plan and Action plan their purpose and contents.

### **Urban Infrastructure Planning**

1. Understanding of different types of urban infrastructures in planning, layout of service lines and interface.
2. Water supply systems: quality and quantity requirements; sources; collection and conveyance of water; treatment methods; treatment plant location; planning distribution systems and their zoning with respect to urban structure.

3. Waste water disposal systems: separate and combined systems; characteristics of waste water; Industrial pollutants and their effects; waste water treatment methods; planning and location of treatment plants; disposal of municipal and industrial effluents, effects of rivers and water bodies; legal aspects.
4. Solid waste collection and disposal: Elements of solid wastes management; classification and properties of solid wastes; on site collection, storage, transportation and disposal of solid wastes; processing and treatment of solid wastes; various social aspects of the solid waste management.
5. Power and communication system: source and distribution networks with safety norms applicable

### **Socio-economic Basis for Planning**

1. Man and environment. Traditional patterns and trends of change in Indian society, concept of social structure, culture and social institutions.
2. Relation between social structure and spatial structure. Social aspects of housing. Social problems of slums.
3. Economic resource, Typology of goods, production economics, process, laws, product and costs. Economies of scale, external economies, valuation, typology of markets, land and real estate market, macroeconomic concepts.
4. Basic economic analysis, economic principles, and land use, economic rent, land use pattern and land values.
5. Development of land and real property, financial balance sheet of land development.
6. Land and real property markets: private ownership and social control over land.

### **Regional Planning**

1. Overview of planning: various types and levels of planning in India and their interrelationship. Concepts of Sectoral & Spatial Planning, Single and multi-level planning processes. National Development Planning Mechanism.
2. Aims, objectives and evolution of Regional Planning. Review of contemporary thoughts on the subject.
3. Introduction to Regional planning techniques; classification of regions, regionalization and delineation techniques for various types of regions.
4. Techniques of understanding spatial structure of regions; Analysis of structure of Nodes, hierarchy, nesting and rank-size.
5. Cluster and Factor analysis methods; use of Remote Sensing in Regional Planning.
6. Regional Planning Theories: Growth pole theory, Christaller's theory, Weber's theory of Location; Coreperiphery theory and Spread and Back Wash theory.
7. National Development issues and Key policies in regard to Regional disparities and imbalances; Urbanization, industrialization and related issues; poverty and unemployment, urban and rural programs and strategies for poverty eradication.
8. Regional planning efforts in India, critical appraisal, Regional Development Plans - types, scopes and objectives, case studies.
9. Regional development models: their structure and characterization and construction; delineation of regions and regionalization methods and techniques: Economic regionalization, composite regionalization.
10. Cost-benefit analysis, dynamics of project analysis, financial feasibility, cost allocation and pricing

## **City & Metropolitan Planning**

1. Urban growth and system of cities: growth of metropolitan and mega cities – scale, complexity and its impact on national development.
2. National and international concepts of human settlement planning and urban development, relevance to Indian context.
3. Metropolitan growth – trends, characteristics, problems. Socio-economic and political issues in India with reference to Asia.
4. Changing urbanity between a city and a metropolis. Anatomy, growth and trends of metropolitan development, components of metropolitan plan; economics, transportation, etc. in evolving metropolitan framework.
5. Multi-nuclei developments: hierarchy of urban centers and their functional linkages.
6. Metropolitan region and problems of major agglomerations, studies in conjunction with the theories of major cities, Dynapolis and Megalopolis, special problems of the central area; migration and sub-urban development; emerging social and economic characteristics of the central city and the suburbs; impact on government systems and public services.
7. Patterns and policies of urban development and decentralization as alternative to metropolitan growth, their merits and demerits.
8. Inter-city issues and problems, approach to development, urban redevelopment and renewal – goals, objectives, costs and benefits.