

# **Architecture Syllabus for Ph.D Eligibility Entrance Test**

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# **Architecture Syllabus for Ph.D Eligibility Entrance Test**

## **AR 1.1 ADVANCED BUILDING TECHNOLOGIES**

1. Evolution of building technology and advancements; Industrial Revolution and its impact, mass housing , rapid construction methods and materials; Structural systems as elements of architectural expressions, modernism and post modernism.
2. Shells, cable, frame, prismatic and geodesic structures, load carrying mechanism, large span structure, lessons from failures.
3. Passive building technologies, building skin, material and construction details for thermal, light and ventilation control ; Traditional Architecture- vernacular vocabulary.
4. Indoor environment, HVAC and artificial lighting, Sick Building Syndrome, performance efficiency, energy efficiency, CFL and LED.
5. Construction technology and lean construction; Toyota experience – just – in time, controlled inventory.
6. Building management system (BMS) ; Safety – entry control; CCTV; Fire and smoke detection , alarm; Thermal and working environment – temperature, humidity , air movement, light level; Occupancy sensors; Simulation

## **AR 1.2 BUILDING BYELAWS AND PROFESSIONAL PRACTICE**

1. Introduction to building byelaws, its needs, objectives, nature, purpose and scope of byelaws.
2. Critical evaluation of building byelaws, need of reform in building byelaws to achieve good built environment.
3. Building byelaws of selected towns, cities and development authorities.
4. Architects Act of 1972, code of conduct, professional responsibilities and scale of charges, architectural competitions.
5. Building contract systems, administration of building contract, invitation of tenders and procedure of award.
6. Architects office management, methods of communication, documentation and computerization.

## **AR 1.3 CLIMATIC DESIGN**

1. Climate responsive settlements – special reference to tropical region, Vernacular features. Natural cooling methods. Indian examples, climate Classifications. Climate components.
2. Definitions of thermal comfort. Thermal comfort indices. Thermal comfort in hot countries. Design of shading devices. Heat flow through building materials. Thermal properties of

common building materials available in India. Thermal performance of building envelope. Building simulation programmes.

3. Definition, Codes and standards on ventilation. Air movement and buildings. Ventilation and buildings. Stack effect. Mechanical ventilation. Ventilation design for hot and humid climates.
4. Design considerations in different climatic zones. Landscaping in tropics. Tropical skyscrapers. Day lighting. Passive and sustainable architecture. Design tools.
5. Energy resources and conservation with reference to built environment. Passive and active systems, energy efficient buildings- Case Studies. Energy management and auditing.

#### **AR 1.4 COMPUTER SOFTWARE FOR ARCHITECTURE**

1. Knowledge of Software such as Revit Architecture Suite including building information modeling (BIM) and 3D Max.
2. Knowledge of software such as Sketch up, Podium and E- view.
3. Knowledge of software such as Catia, Primavera for construction planning management.
4. Knowledge of software such as VisualDOE, EnergyPlus and others related to energy simulation modeling.

#### **AR 1.5 CONTEMPORARY ARCHITECTURE : THEORIES AND TRENDS**

1. Overview of world architecture since 1970 with the study of Late. Modernism, Post Modernism and Deconstructivism.
2. Theories governing contemporary architecture through case studies, evolving architectural trends and their impact on urban built environment.
3. Understanding of Contemporary trends in architecture in India. Understanding of Contemporary directions in architecture in the rest of the world through studies of ideas and works of important architects.
4. Emerging building typologies with emphasis on residential developments, offices, skyscrapers, institutional and public buildings.
5. Evolving building materials and technologies, contemporary approach towards disaster mitigation in the built environment.
6. Energy efficient and built environment with emphasis on the use of energy simulation modeling embodied energy estimation and application of governing codes viz., LEED and ECBC in contemporary buildings.
7. Applications of advanced software by architects viz., virtual reality, parametric design, programme generated architecture and building information modeling (BIM) in contemporary architecture.

## **AR 1.6 DISASTER MANAGEMENT**

1. Hazard, Risk, Vulnerability, Disaster and Disaster Management. Types of Disasters: Hazard and vulnerability profile of India.
2. Relevance of Disaster Risk, Vulnerability & Capacity Assessment in Planning, Concepts of Hazard Assessment, Vulnerability Assessment, Risk Assessment And Capacity Assessment, Hazard Identification and analysis.
3. Four elements of comprehensive disaster management (Preparedness, Response, Recovery and Mitigation), Concept of Mitigation and its importance (Structural and Non – Structural mitigation measures, identification of mitigation measures relating to different types of hazards and implementing strategies).  
Land – use Management tools for disaster risk reduction.(building codes, GDCR, zoning ordinances, land acquisition, transfer of development rights, Recovery and reconstruction plan).
4. National Disaster Management Act, Various State Disaster Management Acts (Gujarat, Uttar Pradesh, Uttaranchal, Bihar) and State disaster management policies (e.g. Orissa, Gujarat, Uttaranchal, Tamil Nadu, Delhi, Uttar Pradesh). Relevance of Rehabilitation and Resettlement Policy in Recovery and reconstruction phase of disaster management. Coastal zoning regulation for construction and reconstruction phase in the coastal areas.
5. Role of Government/Civil Society/International Organizations/Communities and Approaches to Community Based Disaster Risk Management and Planning. (Local coping mechanisms, Importance of Mock Drills and On site volunteer management in Community level disaster preparedness activities).
6. Projects implemented general description of projects carried out in India following natural disasters. Disaster resistant buildings & measures. Recent developments. Case studies in the rest of the World – Bangladesh, Elsalvador, Mexico, Japan etc.

## **AR 1.7 ECOLOGY AND LANDSCAPE DESIGN**

1. Eco- System and development activities, settlement patterns, forestry and agricultural activities and their impact on eco- systems.
2. Climate modifications, hydrological cycles, landforms, vegetation and pollution, preparation of ecological impact statements for major projects.
3. Conservation of ecological balance and environmental quality, national parks and urban park system, landscape planning, and tourism, environmental law relating to nature conservation in urban areas, coastal landscape.
4. Introduction to landscape design, types of landscapes and their characteristics, linkages with nature and built environment. Elements and materials of landscapes, characteristics of

various types of plants, topography and their suitability of landscaping. Landscape conservation – its purpose, preparatory procedure, maintenance of existing landscape. Urban and regional landscapes- ecological and environmental and total built environment. Landscape profession and practice in relation building types, formal and informal design schemes, landscaping paths, gardens and roads. Impact of Science and Technological advancements in landscape planning and design. Techniques of accessing landscape qualities, study of landscape qualities of various functional areas in cities and regions, identification of plant materials and planning design and case studies.

### **AR 1.8 ENVIRONMENT-BEHAVIOR STUDIES**

1. Introduction to EBS in Architecture, EBS Origins and Issues: Intellectual History of EBS  
Conceptualizing the Environment/Behavior Relationship
2. Environmental Perception, Cognition, and Meaning, Socio-cultural Dimensions of Environment/Behavior Relationships, Cultural Similarities and Differences, Multiculturalism Groups, Aggregates and the Designed Environment, Home and Housing for Different Socio-cultural Groups, Elderly and the Environment, Gender, Sexuality, and Space.
3. Sacred and Profane Spaces, Work Environments, Sacred Places/Religious Environments, Children's Environments, Child Care Centers, Educational Facilities, Environments for Health and Aging, Health Care Settings, Elderly and the Environment
4. Institutional Long-Term Care/Residential Settings, Cities and Towns, Neighborhood and Community, Crime and Environmental Design, Small Town Life and Design, Urban Life, Urban Public Space, and Urban Design.

### **AR 1.9 ENVIRONMENTAL PLANNING AND DESIGN**

1. The basic science of environment, the various systems, eco- systems, relationship, between man and environment, feedback mechanism in environment, understanding of these for effective planning and design, IMES.
2. Classification of open spaces based on function, character, size, hierarchy, context, etc., Organization of open space, its relevance in planning analysis and integration in the urban context.
3. Environmental impact analysis, its importance and integration in urban systems and facilities, role and environmental architect in creating necessary awareness, evolving a new approach to design and development.
4. Energy management in building, Waste recycling, Renewable, non- renewable, non-conventional energy systems, Technology related to energy systems, and study of passive and active solar energy systems.

5. Need for a new look at energy options and utilizations, analysis and experimentation in use of natural systems in urban planning with reference to metropolitan city context and environmental laws of India, Eco- culture, Eco- conservation.

#### **AR 1.10 HIGH RISE BUILDINGS**

1. Introduction, high rise buildings in urban environment, physical planning considerations.
2. Architectural design considerations for high rise buildings, space planning and design standards, buildings byelaws and codes.
3. Structural systems in RCC and steel for high rise buildings, composite structural system considerations for wind loads and earthquake loads.
4. Buildings services – mechanical, electrical, firefighting and protection, vertical transportation, HVAC, BAS and parking; Codes for these services.
5. Construction planning and management, equipments and construction techniques, materials for cladding, prefabrication.
6. An approach to sustainable and green high rise buildings including the concepts of Zero Energy Habitat.

#### **AR 1.11 HISTORY OF ARCHITECTURE**

1. Development of architecture in India from the earliest times up to the end of the fourteenth century.
2. Islamic architecture from early Saracenic, imperial and provincial schools up to the Mughal period.
3. Architectural development in ancient civilizations of Egypt, Mesopotamia, Greece and Rome.
4. Architecture in early Christian, Romanesque, Byzantine, Gothic, Medieval, renaissance and Baroque periods.
5. Influence of Industrial revolution on materials, construction and building types. Arts and crafts movement, Art Nouveau, Vienna School, Chicago School etc.
6. Characteristic styles of modern architecture up to First World War. Characteristic styles of modern architecture after the Second World War. Contributions made by pioneers and notable architects.

#### **AR 1.12 HISTORIC PRESEERVATION AND CONSERVATION**

1. Defining Heritage – Cultural value and Cultural capital – Terminologies, Attitude and Approaches to conservation.
2. Various criteria for listing buildings – Documentation Techniques, Status of listed buildings – spot and delisting- Interdisciplinary approaches to buildings recording, conservation and management – Adaptive reuse, Character and issues of Heritage towns – Delineating heritage zones –Planning for heritage towns and heritage areas.

3. Documenting material – Use and structural issues of historic buildings – Focus on restoring and conserving brick structures – Technology, use and repair of iron and steel members –Understating wood and timber structure / methods to conserving timber structures – Traditional plasterwork skills – introduction to the significance and use of lime – working with lime – repairing and replacing plaster – Conserving stone structure – Issue concerning terracotta and mud structures.
4. Explore legislation for the heritage from an international perspective – Reviewing various Charters of ICOMOS; ICCROM; World Heritage Site – Review legislative measures adopted in India –Ancient Sites and Monument Protection Act – Bombay and Hyderabad heritage regulations – proposed Tamil Nadu Heritage Act.
5. An introduction to the economic aspects of conservation – Cultural value and Economic value – Incentives for conservation like Transfer of Development Rights and institution of National cultural fund – Overview of incentive schemes adopted in other countries.
6. Role of various Agencies and Bodies that promote conservation, ASI/INTACH/Heritage Societies/ Urban Arts Commission – Conservation as a public movement.

### **AR 1.13 HUMAN SETTLEMENTS**

1. Physical form, structure, socio cultural and political aspects, growth and decay of settlements during ancient, medieval and Renaissance periods, Industrial evolution and its impacts, Utopian concepts in settlement planning , Contemporary issues.
2. Evolution of ancient settlements influences of Islam in India, Colonial impact, the situation today, problems and prospects.
3. Principles of Ekistics, the elements, structure and classification of human settlement, the analysis of urban and rural settlements with reference to Indian conditions and their growth pattern.
4. Social norms, groups, structures and institutions, ecological processes, economic development theories, Urban Land economics, Land use determinants, Urbanization process in general.
5. The role of Architecture and Planners in shaping human settlement, Community participation Formulating guidelines for development, Futuristic ideas.

### **AR 1.14 PROJECT MANAGEMENT**

1. Introduction to project management, probability theory and its application in construction planning and project management.
2. Introduction to network techniques LOB, CPM, PERT, application to mass housing, Scheduling and controlling of Construction projects.
3. Personal management – concepts definition, growth, role and function of man power estimation for company and for projects, Personal administration at the project site.

4. Building construction industry – components of building industry, building material industry. Method of preparing of line of balance schedule – simple linear programming problems.
5. Resource allocation – resource leveling and smoothing – simple examples – use of computers in resource leveling problems.
6. Development of value analysis techniques and life cycle costing of buildings, components of cost.

### **AR 1.15 URBAN DESIGN**

1. Various aspects of urban design, relationship of urban design to architecture, Planning and landscape, Evolution of Professional discipline.
2. Review of urban forms, Patterns and spaces in different periods of history viz., ancient river valley civilization, Greek, Roman, Medieval, Renaissance, Baroque, Post industrial revolution period in Europe and India and their influencing factors.
3. Elements of urban environment - urban form, townscape, urban spaces, streetscapes, building forms and facades, Public art.
4. Concepts of urban design, Public perception, Imageability and townscape
5. Emerging concepts in urban design, Modern examples of urban settlements, town centers and urban spaces in India and Foreign countries.
6. Urban design principals, tools, techniques and paradigms, Role and types of urban design guidance.

### **AR 1.16 URBAN HOUSING**

1. Historical factors, Impact of colonialism, Demographic, Socio- cultural and economic factors, Current housing situation in India context, Housing Policy, Housing strategies in urban areas.
2. Human needs as determinants of house quality, past experience and present trends, Natural and man-made factors influencing quality, Optimization of land and other resources, cost and energy efficiency, Housing Technology.
3. Historical types in India and developing countries, contemporary patterns, occupancy types and mix , community facilities, space requirements and optimum distribution, implication in terms of qualitative aspects, design methodology.
4. Housing and Urban Poverty, Affordability, financing institutions and their role in Housing development, Framework for the future.
5. Sites and Services approach, Guided Urban Development and building byelaws and their impact in Housing, Evaluation of the regulations with reference to present and future context, Housing Management.