

**University of Pune**  
**Syllabus for PhD Entrance Test**  
**Paper II – Engineering (Architecture)**

**Note:** 1. This syllabus is for the PhD entrance tests conducted in year 2010 only.  
2. Paper II is common for PhD program in all branches under the Faculty of Engineering.

**3. Unit 1 is exclusively for Architecture Branch and other units are as per the Paper-II Engineering Syllabus**

**1. ARCHITECTURE (35 Marks)**

**1.1 ARCHITECTURE**

- 1.1.1 Architectural history, heritage and conservation – Architectural history of Europe and Indian sub-continent, regional architecture of India, modern movement, contemporary architecture across the world. Steps in architectural conservation.
- 1.1.2 Site Planning, Landscape and Urban design – Principles of landscape design and site planning, landscape elements and materials, environmental considerations in landscape planning. Significance of urban design, process of urban design, imageability, universal design, aesthetics, behavioral aspects.
- 1.1.3 Building sciences and construction – Climatic considerations, building climatology, indoor environmental quality, modular coordination, construction techniques and materials, water supply and drainage, advanced services.
- 1.1.4 Professional Practice – Building byelaws, national building code, quantity surveying and estimation, tendering, architects' act, office management.

**1.2 ENVIRONMENTAL STUDIES**

- 1.2.1 Man-Environment relationship – Resource depletion, pollution, resource management, bio-geochemical cycles, urban ecology, global warming, climate change, Urban environmental issues, solid waste management, water conservation.
- 1.2.2 Environmental Impact Assessment – Social, economic and ecological. Techniques and tools.
- 1.2.3 Energy efficiency and Green Building Technology – Norms, standards, rating and evaluation.
- 1.2.4 Disaster Management – Natural and manmade disasters, disaster risk management, planning and design responses.

**1.3 BUILDING SCIENCE & TECHNOLOGY**

- 1.3.1 Construction Technology & Materials– Structural design methods and techniques, seismic design considerations, long span structures, high rise construction, pre-fabricated construction, tensile construction, green building materials, properties and applications of various materials, non-conventional materials and techniques.
- 1.3.2 Building services – drainage and water supply at site level and city level, acoustics, fire fighting, natural and mechanical ventilation, lighting and illumination.
- 1.3.3 Transportation Planning – Traffic sign and signal design, theory of traffic flow, intersection design, integrated transportation planning and modal splits.
- 1.3.4 Project Management – PERT, CPM, Supply chain management, quality control, safety issues on sites.

## **2 Technology Management [20 Marks approx.]**

2.1. Definition of Technology, Management and its relation to society.

2.1.1 Classification of Technology, Management of Technology at various levels.

2.1.2 Role of Technology in creation of wealth. Its impact on National Economy.

2.1.3 Ethics in technology management

2.2 Critical Factors in Technology Management

2.2.1 Problem identification

2.2.2 Importance of creativity

2.2.3 Knowledge management

2.2.4 Relation and importance of pure sciences with Technology

2.3 Protection of Technology- Idea, Invention, Innovation and Intellectual Property

2.3.1 Tools of intellectual property

2.3.2 Patentability aspects, inventions, innovations.

2.3.3 Filing patent applications- processes

2.3.4 Patent Search

2.3.5 International conventions for protection of technology

## **3 Fundamentals of Computer Science [25 Marks approx.]**

3.1 Number Systems and logic Gates

3.2 Computer Architecture

3.3 Primary Memory and Secondary storage

3.4 Input and Output Devices

3.5 Basics of Operating Systems

3.6 Database Fundamentals

3.7 Internet Basics

3.8 Algorithms & flowcharts

3.9 Programming Planning Tools

3.10 Characteristics of Programming Language

3.11 Elementary Programming of C languages (up to Arrays)

## **4. Research methodology [20 Marks approx.]**

**4.1 Research methodology: Basic concept**

4.1.1 Meaning of research

4.1.2 Objective of research

4.1.3 Motivation in research

4.1.4 Types of research

4.1.5 Research approaches

4.1.6 Significance of Research

4.1.7 Research methods and Methodology

4.1.8 Research process

4.1.9 Criterion for good research.

4.1.10 Outcomes of Research

**4.2 Research Problem**

4.2.1 What is a research problem?

4.2.2 Selecting the Problem

4.2.3 Necessity of Defining the Problem

4.2.4 Techniques involved in defining a research problem.

4.2.5 Different ways of literature survey.

4.2.6 Different methods of data collection.

4.2.7 Methods of Analysis and Interpretation of Findings

**4.3 Research design**

4.3.1 Meaning of research design

4.3.2 Need of research design

4.3.3 Development of research plan

4.3.4 Research Report- Components in the Report, Writing the References/  
Bibliography

**Reference Books:**

1. David Kent Ballast, *Practical guide to computer applications for architecture and design*, publisher: Prentice-hall(1986)

2. Johnson Paul Alan, *The Theory of Architecture: Concepts, themes & practices*

3. ICAEN-Sustainable Building Design Manual Vol. 1 & 2

4. *Structure and Fabric* by Everet
5. *National Building Code and I.S.I Specifications*
6. K. Daniels 2003: *Advanced Building Systems- A technical guide for Architects & Engineers*
7. Lynch Kevin(2000)*Good city form*, M.I.T.Press, England
8. Pramar.V.S (2005) *Social History of Indian Architecture*, Oxford University Press, N. Delhi

**Technology Management**

1. Tarek Khalil "Management of Technology", University of Miami, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Satyawrat Ponshe "The Management of Intellectual Property", Bhate & Ponshe Publications, Pune.

**Fundamentals of Computer Science**

1. ITL Education Solutions Limited, "Introduction to Computer Science", Pearson Education(LPE)
2. Behrouz A. Foruzan, Richard F. Gilberg, "Computer Science- A Structured Programming approach Using C", Indian Edition, CENGAGE Publication, 3rd edition.

**Research methodology**

1. Kothari C. R. "Research methodology; Methods and techniques", New Age International Publishers, New Delhi.
2. Briony Oats. *Researching Information Systems & Computing*, SAGE Publishers

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