



## **Department of Computer Science and Engineering**

### **Syllabus for Ph.D. Admission Eligibility Test**

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#### **Paper-I: Research Methodology**

Research and Types of research: Meaning of Research- Objectives of Research- Motivation in Research. Research methods vs Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical. Research Process. Criteria of good Research. Research Formulation – Defining and formulating the research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem – Literature review – Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review - Development of working hypothesis. Data Collection and analysis: Execution of the research - Observation and Collection of data - Methods of data collection – Modeling, Mathematical Models for research, Sampling Methods- Data processing and Analysis strategies. Data Analysis with Statistical Packages – Hypothesis-testing, Generalization-and Interpretation.

#### **Paper-II: Core Subjects**

##### **UNIT- I: Data Structures and Algorithms**

Programming in C, Asymptotic Notations, stacks, queues, linked lists, trees, binary search trees, binary heaps, Graphs, Searching, Sorting and Hashing. Algorithm design techniques: divide-and-conquer, Greedy, Dynamic programming and Backtracking, NP-Hard and NP-Complete.

##### **UNIT - II: Computer Organizations and Operating Systems**

Boolean algebra, Number representations and computer arithmetic, Instructions and addressing modes

Instruction pipelining Memory hierarchy. I/O interface (interrupt and DMA mode).

System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

### **UNIT - III Data Warehousing and Mining**

Databases and Database users, Database systems concepts and Architecture, Data modeling using the Entity-Relationship model, Introduction to Data Mining, Business Intelligence, Data Warehouse and OLAP Technology, Data Preprocessing, Extraction, Transformation and Loading, Data Mining Primitives, Regression, Associations, Classification and Prediction, Cluster Analysis.

### **UNIT - IV Networks and Security-**

The OSI model, layers in OSI model, TCP/IP suite, Physical Layer, Data link layer, Medium Access sub layer Network Layer, Transport Layer, Application Layer, Secret Key Cryptography, Hash Functions and Message Digests, Public key Cryptography and Authentication.

### **UNIT - V Artificial Intelligence and Cloud Computing**

Problem Solving by Searching, Knowledge and Reasoning, Uncertain knowledge and Reasoning, Learning, Problem Solving by Searching, Cloud Computing Overview, Cloud Insights, Cloud Architecture- Layers and Models, Virtualization, Simulators of Cloud.

### **UNIT - VI Software Engineering**

Process Models, Agile Process Model, Requirement Engineering, Design Engineering, Software Metrics and Testing, Object Oriented Design.