



KRISTU JAYANTI
(DEEMED TO BE UNIVERSITY)
Under Section 3 of UGC Act 1956
A CMI INSTITUTION | BENGALURU | INDIA

Centre for Research and Development
Office of Doctoral Studies

Syllabus for the Part B of
Kristu Jayanti University Entrance Test (KJUET)

Ph. D. Programme in Computer Science / Computer Applications / Data Sciences

Unit 1: Computer Systems and Programming Paradigms

Computer Architecture – Logic circuits, Instruction set architecture, Addressing modes, RISC vs CISC, Pipelining, Multiprocessors, Cache, Virtual memory. **Operating Systems** – Process management, CPU scheduling, Deadlocks, Memory management, File systems, Virtualization, Distributed OS, Security, Shell scripting. **System Software** – Assemblers, Compilers, Linkers, Loaders, Macros. **Programming Paradigms** – Structured programming concepts, Object Oriented Programming Concepts, Web Programming, Middleware Technologies.

Unit 2: Data Structures, Algorithms, and Theory of Computation

Data Structures – Arrays, Linked lists, Stacks, Queues, Trees, Graphs, Hashing, Searching & Sorting techniques. **Algorithms** – Divide and conquer, Dynamic programming, Backtracking, Branch and bound, Complexity Analysis. **Theory of Computation** – Finite automata, Pushdown automata, Context-free grammars, Parsing techniques, Turing machines, Recursive & recursively enumerable languages, Chomsky hierarchy.

Unit 3: Software Engineering and Computer Graphics

Software Engineering – Process models, Requirements analysis, Software design, Quality assurance, Risk & Configuration management, Software Project Management. **Computer Graphics**: Video-Display Devices, Raster-Scan and Random-Scan Systems, Basic drawing primitive algorithms, clipping and rendering algorithms, 2-D Geometrical Transforms and Viewing, 3-D Object Representation, Compression Techniques.

Unit 4: Advanced Database Concepts

Databases – Data models, Three level architecture, Relational algebra, Query Languages, Normalization, Query optimization, Transaction processing, Concurrency control, Recovery, Security, Advanced Databases – Data warehousing, Data mining, Big Data, NoSQL.

Unit 5: Computer Networks and Security

Computer Networks and Security – OSI & TCP/IP models, Types of Networks, classification of IP addresses, Switching techniques, Routing, Virtual Private Networks, Firewalls, Wireless Networks and Topologies- Network Security – Cryptography, Digital Signature.

Unit 6: Cloud and Distributed Communication Systems

Cloud Computing: Distributed system concepts, types of cloud services and deployment, Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, IOT: IoT Architecture and Protocols, Cloud & IoT security.

Unit 7: Cognitive Computing

Linear algebra, Graph Theory, Optimization Techniques, Probability and Distributions, Hypothesis testing, Regression, Knowledge representation, Expert systems, Programming Tools- Supervised and unsupervised learning, Classification, Clustering, Evaluation metrics, Deep learning, NLP, Generative AI, Evolutionary algorithms.