School of Engineering and Technology
Department of Computer Science and Engineering

Syllabus for Ph.D. Entrance Exam

Discrete Structures: Sets, functions, relations, counting; generating functions, recurrence relations and their solutions; algorithmic complexity, growth of functions and asymptotic notations.

Programming, Data Structures and Algorithms: Data types, control structures, functions/modules, object-oriented programming concepts: sub-typing, inheritance, classes and subclasses, etc. Basic data structures like stacks, linked list, queues, trees, binary search tree, AVL and B+ trees; sorting, searching, order statistics, graph algorithms, greedy algorithms and dynamic programming.

Computer System Architecture: Boolean algebra and computer arithmetic, flipflops, design of combinational and sequential circuits, instruction formats, addressing modes, interfacing peripheral devices, types of memory and their organization, interrupts and exceptions.

Operating Systems: Basic functionalities, multiprogramming, multiprocessing, multithreading, timesharing, real-time operating system; processor management, process synchronization, memory management, device management, File management, security and protection; case study: Linux.

Software Engineering: Software process models, requirement analysis, software specification, software testing, software project management techniques, quality assurance.

DBMS and File Structures: File organization techniques, database approach, data models, DBMS architecture; data independence, E-R model, relational data models, SQL, normalization and functional dependencies.

Computer Networks: ISO-OSI and TCP/IP models, basic concepts like transmission media, signal encoding, modulation techniques, multiplexing, error detection and correction; overview of LAN/MAN/ WAN; data link, MAC, network, transport and application layer protocol features; network security.

Artificial Intelligence: Artificial Intelligence , Intelligent Agents- agent, environment, intelligent agents, types of agents, nature and properties of environment, Representations and Mappings, Approaches to Knowledge Representation, Knowledge representation methods, Propositional Logic, rules of inference, Predicate logic, Representing Simple facts in Logic, Resolution, Forward and backward chaining, Game Playing, adversarial search, types of games, zero sum game, game tree, Minimax Search algorithm, alpha-beta pruning, Reasoning in AI. Artificial neural network- components of ANN, ANN architectures, activation functions, Perceptron learning-Supervised and Unsupervised learning applications of ANN, advantages and disadvantages of ANN Genetic Algorithm- History and evolution of G.A, Modeling a problem for the application of G.A.— Representation of data in chromosomes, Fitness function, reproduction and convergence, Applications of G.A., advantages of GA, Comparison of ANN and GA Digital image processing, Image enhancement, Image Restoration and Morphological image processing, Image Segmentation and Object recognition.

Signature of Department Ph.D.
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