



Faculty of Engineering

Department of Computer Applications

Syllabus for Ph. D. Entrance Exam

Computer Networks:

ISO/OSI stack, transmission media, data encoding, multiplexing, flow and error control, LAN technologies (Ethernet, token ring), network devices - switches, gateways, routers, ICMP, application layer protocols - SMTP, POP3, HTTP, DNS, FTP, Telnet, network security - basic concepts of public key and private key cryptography, digital signature, firewalls

Algorithms:

Asymptotic notations, space and time complexity, Best, worst and average case analysis. Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, spanning trees, shortest paths, Sorting, Searching. Basic concepts of complexity classes - P, NP, NP hard, NP complete.

Operating System:

OS Structure, multitasking, multiprogramming, multithreading, Process Management, CPU scheduling, Deadlocks. Inter-process Communication, Memory management, Virtual memory, Demand Paging and Page Replacement Algorithms. I/O and Device management.

Data Structures: Definition, Arrays, Function, Recursion, Stacks, Queues, Linked Lists, Singly and Doubly linked list.

Software Engineering: System Development Life Cycles (SDLC): Steps. Waterfall model, Prototype Model, Spiral model. Software Metrics: Software Project Management, COCOMO Model. Design: System design, detailed design, function oriented design, object oriented design, user interface design. Coding and Testing: Testing level metrics. Software quality and reliability, software reengineering.



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Introduction to C: Data types, Constants and Variables, Operators, Expressions and Control Structures. arrays. Pointers. String, Standard and User defined Function, . Recursion. Structures and Union, Enumerations, Pre-Processors directives, File Handling.

Introduction to C++: Structures, Function Overloading, Default Parameters, Inline Functions. Class and Objects, Constructors, destructors, dynamic memory allocation, Inheritance, Polymorphism, friend function, Templates.

Databases:

ER - model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures, Transactions and concurrency control.