

**Datta Meghe Institute of Higher Education and Research
(Deemed to be University), Wardha**



**Computer Science and Information Technology
for
AIPHDCET under DMIHER (*Theme based*)**

FACULTY OF COMPUTER SCIENCE & TECHNOLOGY

Content:

Curriculum of Computer Science and Information Technology for AIPHDCET, DMIMS(DU)

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Theme1:Engineering Mathematics & Digital Logics

Engineering Mathematics:

Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Monoids, Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting ,recurrence relations, generating functions.

Linear Algebra: Matrices, determinants, system of linear equations, eigen values and eigen vectors,L U decomposition.

Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

Probability and Statistics: Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Computer Science and Information Technology

Digital Logic: Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic(fixed and floating point).

Theme 2: Computer Organization and Architecture, Programming and Data Structures

Computer Organization and Architecture: Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy:cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Programming and Data Structures: Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Theme 3:Algorithms &Theory of Computation

Algorithms: Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and- conquer. Graph traversals, minimum spanning trees, shortest paths.

Theory of Computation: Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability.

Theme4:Compiler Design & Operating System

Compiler Design: Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate Code generation. Local optimization, Dataflow analyses: constant propagation, liveness analysis, common sub expression elimination.

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

Theme 5:Databases & Computer Networks

Databases: ER-model. Relational model: relational algebra, tuple calculus, SQL.Integrity constraints, Normal forms. File organization, indexing(e.g. B and B+trees).Transactions and concurrency control.

Computer Networks: Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit-switching; Data link layer: framing, error detection,Medium Access Control, Ethernetbridging ; Routing protocols : shortest path, flooding, distance vector and link state routing ; Frag mentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP,DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control,UDP, TCP, sockets ;Application layer protocols : DNS, SMTP, HTTP, FTP, Email.

RECOMMENDED BOOKS FOR REFERENCE:

1. GATE preparation Books