NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL
DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES

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General Instructions for the candidates who are appearing for the M.Tech(CDS) (Self-Financed PG Programmes 2023-2024), Written Aptitude Test & Interview:

1. Syllabus for the written aptitude test is provided in annexure.
2. A written aptitude test consisting of multiple choice questions will be conducted. Total marks for the test is 40.
3. Time duration is 60 minutes.
4. **Written Test Date and Time**: August 1st 2023, 4:00 PM – 5:00 PM.
5. Shortlisted candidates will be called for the Interview
6. **Interview Date and Time:** August 2nd 2023, 10.00 AM Onwards
7. For any further updates, the candidates are requested to visit our Institute's Website regularly.

Sd/-

Head of the Department

Annexure:

Syllabus for the Written Aptitude Test

Digital Logic

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

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.

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

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.

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, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation 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.

Probability and Statistics

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

Linear Algebra and Matrices

Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

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