M-51

Name of the Faculty: Faculty of Engineering and Technology

Department: Computer Engineering

Name of the Program: M. Tech in Computer Engineering

Type of Questions	Test Duration (in minutes)	No. of Questions	Max. Marks	Negative Marking (Yes/No)
Objective/Multiple Choice	90 minutes	100	100	Yes (-0.25 marks for each wrong answer)

Important Instruction

1. Calculator, Mobile Phones and other Electronic gadgets are not allowed
2. Only Black / Blue Pen to be used.

Detailed Syllabus for M.Tech Entrance Test

Discrete Mathematics:
Set theory, Relations, Algebraic structures: semigroups, monoids, groups; Counting, Recurrence relations, Generating functions, Propositional logic, Graph theory: connectivity, spanning trees, isomorphism, Euler & Hamiltonian circuits, planarity and colouring.

Data Structures and Programming:
Programming in C & C++, Abstract data types, Stacks, Queues, Linked lists, Trees, BST, Heaps, Basics of Sorting, Searching & Hashing.

Object Oriented Programming:
Object oriented methodologies, Objects, classes, Inheritance, Polymorphism.

Algorithms:
Asymptotic notations, Time complexity analyses, Analysis of Sorting and Searching techniques, Ranking of functions, Algorithm design strategies: divide-and-conquer, greedy approach, dynamic programming; Trees and graphs traversals, Shortest paths, Basic of complexity classes – P, NP, NP-hard, NP-complete.

Software Engineering:
Software requirement specifications, Software process models, Process life cycle, Metrics & Estimation techniques, Software modelling, Software design, Software coding, Software testing, Software maintenance.

Digital Logic:
Number systems, Boolean algebra, Design of combinational & sequential circuits, minimizations, Logic functions, Minimization, Design of combinational and sequential circuits, fixed and floating point number representation & arithmetic, Digital system design.

Computer Organization and Architecture:
Addressing modes, ALU and CPU design, Memories: cache, main memory, secondary storage; I/O interface: mapping, interrupts & DMA technique; Pipelining and parallelism.

Theory of Computation:
Automata theory, Regular expressions & languages, Context free Grammar & Push-down automata, Pumping lemma, Turing machines, Undecidability.

Compiler Design:
Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Code optimization.

Operating System:
Processes, Threads, Inter-process communication, Scheduling, Concurrency, Synchronization, Deadlock, Memory management and virtual memory, File systems, I/O systems.

Database:
Database models, Relational model: algebra & calculus; Database design and normalizations, Transaction management & concurrency control, SQL, File structures: sequential files, indexing, B & B+ trees.

Computer Networks:
ISO/OSI and TCP/IP Layering stack, Network technologies, Framing, Switching, Addressing schemes: IPv4 & IPv6, Routing techniques, Congestion and Flow control, TCP/UDP, Application layer protocols, Basics of wireless networks, Mathematics of cryptography, Authorization, Authentication, Symmetric cryptography, Asymmetric cryptography, Digital signatures.