



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

M.Tech. – CSE/AI/DS/CS/IOT

Syllabus PG Entrance Test

JET 2022

1. ENGINEERING MATHEMATICS

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

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

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

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

2. DIGITAL LOGIC

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

3. COMPUTER ORGANIZATION AND ARCHITECTURE

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

4. COMPUTER PROGRAMMING AND DATA STRUCTURES

Programming in C, Object oriented programming

Arrays, stacks, queues, linked lists, trees, searching sorting techniques, hashing & graphs.

5. ALGORITHMS

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

6. OPERATING SYSTEM

Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

7. 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.

8. DATA COMMUNICATION & COMPUTER NETWORKS

Analog and digital signal, signal characteristics, Multiplexing techniques, Communication channel, switching techniques .Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP).

Wi-Fi: Basics, Frame work, operation and security. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

9. SOFTWARE ENGINEERING

Overview of Software Engineering, Software Process & Project Metric ,Risk Analysis & Management, Software Testing Strategy and Techniques, Software Quality Assurance, Software Configuration Management, Software Maintenance

REFERENCE TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2010.
3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, Hyderabad, 2008.
4. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, “Operating System Concepts Essentials”, John Wiley & Sons Inc., 2010
5. James F. Kurose, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Pearson Education, 2006
6. Bhave, Patekar, “Object Oriented Programming with C++”, 2nd Edition, Pearson Publication,
7. Roger. S. Pressman, “Software Engineering – A Practitioner’s Approach”, Tata McGraw Hill
8. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, First Edition, Oxford University Press, 2009.
9. Computer Systems Architecture – M.Moris Mano, III rd Edition, Pearson/PHI.
10. Tanenbaum A. S., “Data Structures using ‘C’ ”
11. Henry F. Korth and Silberschatz Abraham, “Database System Concepts”, Mc.Graw Hill
12. Ibe, O.C. “Fundamentals of Applied Probability and Random Processes”, Elsevier, U.P., 1st Indian Reprint, 2007
13. LINEAR ALGEBRA Jim Hefferon Fourth edition
14. Theory and Problems of discrete mathematics Third Edition Seymour Lipchitz, Ph.D. Marc Lars Lipson, Ph.D