Sardar Patel University of Police, Security and Criminal Justice, Jodhpur, Rajasthan

Syllabus for Entrance Examination

Master of Technology in Cyber Security (one hour)

Objective type 50 Question.

(**Total Marks: 50**) Computer Science (**40 Marks**)

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.

Programming and Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

Algorithms: Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes – P, NP, NP-hard, NP-complete.

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and Virtual Memory, File systems, I/O systems, Protection and Security.

Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File Structures (sequential files, indexing, B and B+ trees), Transactions and Concurrency Control.

Information Systems and Software Engineering: Information gathering, Requirement and feasibility analysis, Data flow diagrams, Process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, Implementation, Maintenance.

Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and Error control

Techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer

Protocols (ICMP, DNS, SMTP, POP, FTP, HTTP); Basic concepts of hubs, switches, gateways, and routers.

Network security: Basic concepts of Public key and Private key cryptography, Digital Signature, Firewalls.

Web technologies: HTML, XML, basic concepts of client-server computing.

Engineering Mathematics, Aptitude & Reasoning   (**10 Marks**)

Mathematical logic, Probability, Set theory & Algebra, Combinatory, Graph theory, Linear algebra,

Calculus, Reasoning and Aptitude.