राष्ट्रीय प्रौद्योगिकी संस्थानश्रीनगर
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
(An autonomous Institute of National Importance under the aegis of Ministry of Education, Govt. of India)
हजरतबल, श्रीनगर , जम्मू-कश्मीर, 190006,भारत
Hazratbal, Srinagar Jammu and Kashmir, 190006, INDIA

SYLLABUS FOR SCIENTIFIC/TECHNICAL OFFICER (CSC)

Basic Computer Fundamentals: Programming in C and JAVA - sequence, selection and repetition statements, Recursion, Arrays, Problems involving arrays - Error identification – debugging

Data Structures – Stacks, Queues, Linked Lists, Trees, Binary Search Trees, Binary Heaps, Graphs

Operating Systems – Processes, Threads, Inter-Process Communication, Concurrency and Synchronization, Deadlock, CPU Scheduling, Memory Management and Virtual Memory, File Systems

File Management: File organization: blocking and buffering, file descriptor, directory structure. File and Directory structures, blocks and fragments, directory tree, inodes, file descriptors, UNIX file structure. Concept of I/O management

Microprocessor Operations:- Instruction Cycle, Data fetch, Address Decoding, Classification of Interrupts, Input Output Techniques, Device Controllers(DMA controller , Disk drive controller) Computer Memory and Memory Management Techniques: Types and characteristics, Classification

Of memory devices

Databases – E-R Model, Relational Model: Relational Algebra, Tuple Calculus, SQL, Integrity Constraints, Normal Forms, File Organization, Indexing: B and B++ Trees, Transactions and Concurrency Control.

System maintenance and troubleshooting – Windows and Linux OS installation procedures - Dual boot – Reserving space for User/ System while installing OS – Trouble shooting issues related to OS, device drivers – Installing packages through apt- get install – using GUI

Computer Networks – Creating LAN using switches – Understanding switching tables - Networking commands – ping, netconfig, IP lookup, traceroute – IP settings – DHCP – DNS - Wi-Fi settings – Wired LAN – Wireless LAN – Access points, Concepts of Layering, Flow and Error Control Techniques, Switching, IPv4/IPv6, Routers and Routing Algorithms: Distance Vector and Link State, TCP/UDP and Sockets, Congestion Control, Application Layer Protocols: SMTP, POP, FTP, HTTP

Network Security: Authentication, Basics of Cryptography, Digital Signatures and Certificates, Firewalls, Basic Concepts of Client Server Programming, Cryptography, Digital Signatures and Certificates, Firewalls, Basic Concepts of Client Server Programming

Practical Networking: Explain the role and function of network components: Routers, L2 and L3 switches, Next-generation firewalls and IPS, Access points, Controllers, Endpoints, Servers, Describe characteristics of network topology architectures 2 tier, 3 tier, WAN ,Small office/home office (SOHO) and cloud,Compare physical interface and cabling types, Single-mode fiber, multimode fiber, copper, Connections (Ethernet shared media and point-to-point),Concepts of PoE

Website design and MIS – Website Design principles, database connectivity – applications involving HTML, CSS, JavaScript, .NET, Decision Making & Types of information systems.

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Management information systems, transactions processing systems, decisions support systems, office automation systems and knowledge-based systems

Software Engineering: Components of Software process , process framework, process assessment , Software Life Cycle Models, Selection criteria, Process change management , Requirement Engineering process, Feasibility Study, Requirements Analysis – Structured Analysis, Object Oriented Modelling, Other approaches, Requirements Management

Software Design – basic principles, concepts , Data design , Data Architectural design, Component level design , User Interface design , Pattern based Software design, Design Notations, Design Reviews – types, process, evaluating reviews, Software Design Documentation