

**DETAILED SYLLABUS FOR THE POST OF
WORKSHOP INSTRUCTOR / DEMONSTRATOR / INSTRUCTOR GR.II IN
COMPUTER ENGINEERING IN TECHNICAL EDUCATION**

(Cat.No. : 680/2022)

(Total Marks- 100)

Programming in C & Data structures (10 Marks)

Programming concepts in C, Functions and Pointers, Recursion, Arrays, Strings and Structures, File Linear Data Structures – Stacks & Queues, Linked Lists, Non Linear Data Structures – Trees & Graphs

Object oriented Programming Concepts, C++ & JAVA Programming (10 Marks)

Characteristics of OOP, Objects and Classes, Overloading, Inheritance
Programming Concepts in C++, Virtual functions, Templates
Features of JAVA – Building Java applications, Interfaces, GUI programming, Database Connectivity

Database Management System & SQL (10 Marks)

DBMS, Data Models, Database Schema, Database Languages, Relational Model Concepts, SQL, Data Definition Language, Data Manipulation Language, Retrieval Queries, Triggers, Views, Entity Model, ER Diagrams, Enhanced ER model, Transaction Processing, Mobile databases.
Structured Query Language - Data types - DDL Commands – Integrity constraints - DML commands - Functions, Procedure, Cursor, Trigger - Database connectivity using JDBC/ ODBC - Normalisation - Functional Dependency – Decomposition - Object oriented databases - Parallel DBMS - Distributed DBMS - Mobile Databases - Data Mining - Data warehousing

HTML, CSS, Javascript and PHP (10 Marks)

Internet - Internet Protocol Address - Domain Names - World Wide Web - Web Browsers - Web Servers – URL – MIME – HTTP
HTML- tags- attributes - table – form – frame - format tags- image tags - embedding multimedia.
CSS – CSS Types - CSS selectors – CSS Properties – font, colour, background, list, link, text
Java script – programming – DOM - event handling - data validation - dynamic documents – positioning elements, moving elements, element visibility, font and colour changing, dynamic content.
PHP - Server Side Scripting – Installation & Configuration – PHP language elements - Form Handling – Session – Cookie – page redirection – file uploading – file handling - PHP Database Interface - Web Hosting , Content Management System.

Smart Device Programming (10 Marks)

Various mobile technologies- Apple IOS – Android operating system- Operation of Android Virtual device - Life cycle of an activity intent – linking activities using intent- data passing between activities using intent – android components
UI components - data storage in Android- various storage technologies - SQLite database - content Providers - SMS service in Android - publish application in Google Play Store.

HTML components for mobile applications - HTML 5 tags and attributes for mobile development- Styling Mobile Pages with CSS3 - Simple applications using HTML5 and JavaScript

Digital Computer Principles

(10 Marks)

Number Systems, Signed Number Representations - Boolean algebra, Basic and universal gates, truth table, K-map up to 4 variables, Combinational Logic: Analysis & Design procedure-using Gray to binary, Half & Full Adder, 4-bit Parallel adder, Magnitude Comparator, Decoder, Encoder, priority encoder, multiplexer. Sequential circuit:- latches and flip flops, Registers, shift registers- data transmission in shift registers, Asynchronous counter- Synchronous counter- Ring Counter.

Computer Architecture & Organization

(10 Marks)

Computer Function and Internal Memory - The Von Neumann Machine – Computer Components - Computer functions – Instruction Fetch and Execute – Interrupts – I/O Function- Interconnection structures - Bus Interconnection – Bus Structure –Multiple Bus Hierarchies
Characteristics of Memory System –The Memory Hierarchy - Cache Memory Principles - Elements of Cache Design - Semiconductor Main Memory –Types of ROM - DRAM types
Magnetic Disk - RAID – Level 0,1,2,3,4,5,6 - Optical Memory – Compact Disk – Digital Versatile Disk – High Definition Optical Disks
External Devices – Keyboard - Monitor – Disk Drive - I/O Modules – Module function – Programmed IO, Interrupt Driven IO, DMA
Processor organization - Register organization – Instruction Pipelining
Control Unit Organization - Micro operations – Fetch Cycle – Indirect Cycle - Interrupt Cycle – Execute Cycle – Instruction Cycle -
Control of the Processor - Hardwired implementation - Micro programmed control
Parallel processing - Multiple processor organization
Personal Computer, Motherboard, Chipsets, Expansion Slots, Memory, Power supply & Storage devices, Peripherals, Connectors and Cables, Input devices, Output devices, Printers, Laptops and other Portable devices

Computer Networks

(10 Marks)

Components of communication – Data flow – Network attributes - Physical structure – type of connections, topology, Categories – Inter connection - protocols – standards
ISO OSI model – functions of layers.
Analog and digital – data, signals - bandwidth – bit rate, bit length – digital transmission – base band, broad band – impairments – analog to digital – Transmission modes – parallel, serial, asynchronous, synchronous – digital to analog – ASK, FSK, PSK – analog to analog – AM, FM, PM – Multiplexing – FDM, WDM, TDM
TRANSMISSION MEDIA - Guided – twisted pair, co-axial, fiber optic – unguided – switched networks
Error detection and correction – coding – coding schemes –framing – flow and error control – DLL protocols – HDLC – Point to point protocol
TCP/IP – architecture, Description of layers, addressing – wired LAN – Ethernet protocol – wireless LAN – IEEE 802.11 – architecture – LAN connecting devices
Network layer services – Performance – IPV4 address – address space, addressing – DHCP – Internet protocol (IP) – IPV4 datagram security – Routing algorithms
Transport layer services - Transport layer protocols – UDP – TCP – SCTP
Application layer services - WWW - URL – HTTP – FTP – Electronic mail – SMTP, POP and IMAP - TELNET – DNS

Microprocessors, Microcontrollers and Interfacing

(10 Marks)

80x86 Architecture- Addressing Modes- Hardware structure of 8086- Instruction Set of 8086 processor- Interrupt mechanism of x86 & Interfacing of chips - Advanced Processor technologies AVR Microcontrollers & Assembly Language Programming, AVR Architecture with block diagram AVR Data Memory, Program counter and Program ROM, Branch instructions and Looping- Time delay and Instruction pipeline, I/O port programming in AVR, Programming timers and counters - AVR interrupts and programming, Interfacing sub systems with AVR

System Administration & Information Security

(10 Marks)

LINUX Commands, SHELL Scripts, LINUX Server Administration

Computer Security : Triad – concepts – OSI architecture

Cryptography : Symmetric encryption – Algorithms – MAC – One way Hash Function – Public key cryptography – digital signature

User Authentication: Means of authentication - Password based Authentication - Password attack strategies and countermeasures - hashed passwords - password cracking - user password choices - password File access control - password selection.

Authentication Methods: Physical characteristics in biometric applications - operation – accuracy - Remote User Authentication – security issues

Access control: Access control policies - requirements

Intrusion and Detection: Requirements of IDS - Host based Intrusion detection - audit records - anomaly detection - signature detection -

Distributed host based intrusion detection - Network based intrusion detection - Intrusion Detection Exchange Format - Honey pots - SNORT IDS – Architecture and rules

Malicious Software: Virus structure – Antivirus approaches - Antivirus techniques – Worms - Worm Countermeasures - BOT – ROOTKIT

Denial of Service: Denial of Service Attacks - Source Address Spoofing - SYN Spoofing - Flooding Attacks - ICMP Flood - UDP Flood - TCP SYN Flood - Distributed Denial of Service Attacks - Defenses against DoS Attacks

Firewall: Types - Host based firewalls - Personal firewalls - Internal and external Firewall - Distributed Firewalls

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper