

**DETAILED SYLLABUS FOR THE POST OF LECTURER IN INFORMATION  
TECHNOLOGY (GOVT. POLYTECHNICS) IN TECHNICAL EDUCATION  
(POLYTECHNICS) - DIRECT RECRUITMENT**

**(Category Nos.:239/2023)**

**Information Technology - 100 marks**

**Module I: Computer Organization and  
Architecture (25 marks)**

**Digital Computer Principles:** Number systems – Binary, Decimal, Octal and Hexadecimal Conversion, Arithmetic operations, Boolean algebra, Logic gates, SOP, POS, Minterm and maxterms, Boolean expression, simplification, Postulates and theorems, Simplifications, K-Map, Combinational logic circuits – Adder, Subtractor, Multiplexer, Demultiplexer, Encoder, Decoder, Sequential Circuits – SR, JK, T, D flip flops, Shift registers, Asynchronous, synchronous and Modulo n Counters.

**Computer Organization:** Multiprocessors and microcomputers, Assembly language, Assembler directives, Semiconductor memory – Internal organization, SRAM, DRAM, SDRAM, Rambus memory, ROM technology, Cache memory, virtual memory, working of magnetic disks and tapes, optical disks, Instruction sequencing, Instruction execution, Hardwired control and microprogrammed control, micro instructions, Pipelining.

**Microprocessors:** Internal architecture of 8085 and 8086, interfacing with peripheral devices, microcontrollers.

**Module II: Operating Systems (15  
marks)**

**Operating Systems:** Batch, microprogramming, time sharing, multi processor and real time systems, Process management, Process Control Block, Threading, multi-threading, CPU Scheduling, Schedulers, Context switching, Pre-emptive and non-preemptive scheduling, Scheduling algorithms – FCFS, SJF, Priority, RR, Multi-level and multilevel feed back queue, Race condition, Critical section problem, Deadlock – detection and prevention, Memory Management – Address bindings, logical and physical addresses, contiguous memory allocation – first fit, best fit, worst fit allocation, internal and external fragmentation, Paging and segmentation, Demand paging, Page replacement algorithms – FIFO, Optimal, LRU, Thrashing, File systems, Sequential and indexed file organization, Directory structures, Contiguous, linked and indexed allocations, Disk scheduling algorithms.

### **Module III: Programming Languages and Software Engineering (15 marks)**

**Object Oriented Programming :** OOPs concepts, POP and OOP, Benefits of OOP, objects, classes and methods, constructors, operator and function overloading, Inheritance and Polymorphism, Multi-threading and exception handling, Programming in C++ and JAVA

**Software Engineering:** Software life cycle models, Project planning - LOC, COCOMO, PERT / CPM, Gantt Chart, SRS, Data flow diagrams, Testing - Black box and white box, Software reliability, Reliability metrics, ISO 9000, SEICMM, CASE.

### **Module IV: Data Structures (10 marks)**

**Data Structures:** Stack - Array representation, Push and Pop operations, Infix, prefix and postfix conversion, Queue - insertion and deletion, circular queue, Priority queue, De-queue, Dynamic memory allocation, Linked lists, Insertion, deletion, traversal of Linked lists, Doubly linked lists and circular lists, Binary tree representation, Binary search tree, insertion, deletion, and traversal on BST expression tree and threaded binary tree, Graph - directed graph, Adjacency Matrix and Adjacency List representation, graph traversal algorithms - BFS and DFS.

### **Module V : Database Management Systems (10 marks)**

**Database Management Systems:** Advantages over conventional file systems, Database users, Schema architecture, Data independence - physical and logical, Database models - Hierarchical, Network and Relational, DBMS architecture, DDL, DML and DCL, Centralized, 2 tier and 3 tier architecture, ER model, Relationship, ER diagram, UML - class diagram, Relational model concepts, Keys, Relational algebra, Selection, Projection, Union, Intersection, Cartesian product, join, Division, Domain and integrity constraints, Functional Dependency, Normalization - 1NF, 2NF, 3NF, BCNF, Transaction management, concurrent process, SQL - data types, Create, Drop, Select, Update, Insert, Delete commands, Integrity constraints, Grouping, Commit, Rollback, Views, Trigger, Cursors, Embedded and Dynamic SQL, ODBC and JDBC.

## **Module VI : Networking and Web Technology (25 marks)**

**Data Communication:** Components, LAN / MAN / WAN, Topologies, Analog, Digital Communication, ISO-OSI Architecture, TCP/IP, Transmission impairments, Media - Guided and unguided, Encoding techniques, Modulation, Error detection and correction, ARQ techniques, Multiplexing, FDM-TDM-WDM, Wireless communication, Switching techniques, Polling.

**Computer Networks:** Data Link Layer - MAC Sublayer, CSMA, CSMA/CD, Ethernet, IEEE Standards, LLC, ATM, Network layer - Routing algorithms, Congestion control algorithms, IPV4 and IPV6, Subnetting, Transport Layer - Services, Service primitives, Addressing, Application Layer - DNS, E-mail architecture, SMTP, POP3, MIME, Network Management Devices - Repeater, Hub, Switch, Router, Gateway, Wireless access point, Bluetooth, UDP, HTTP, FTP, TELNET, VOIP, Public key and private key cryptography, digital signature, firewalls.

**Web Technology:** Server Softwares, HTML tags, Form controls, Embedding multimedia, Cascading Style sheets, inline, embedded and external style sheets, Building CSS menu, Creating user style sheets, Server side and client side scripting, Programming in Java Script, Event handling, Data validation, Server side scripting - configuration of Apache, MySQL and PHP, PHP - language elements, Functions, Classes and objects, Database connectivity, Session handling, Cookies, File uploading, Sending emails in PHP, Developing story board, Web optimization, Web hosting - Domain name registration, Server space hiring, FTP utilities, Web promotion techniques.

**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.