Nepal Government
Ministry of Communication and Information Technology
National Information Technology Center (NITC)

Post: System Administrator
Class: Gazette III

Syllabus

1. Computer Fundamentals
   1.1 Computers, Kinds of Computers in respect of size and function,
   1.2 Generation of Computers,
   1.3 Components and Architecture of Computers, Connecting the Components,
   1.4 **Getting started:** Orientation to personal computers, the system unit, Starting the computers
   1.5 **Input Devices:** The keyboard, The mouse, Other input devices
   1.6 **Processing:** CPU, Memory
   1.7 **Storages devices:** Overview of Storage Devices, The Floppy Disk Drive, The Hard Drive, The Universal Serial Bus(USB) Devices and Other Storage Devices
   1.8 **Output devices:** Monitors, Printers, Modems, Soundboards
   1.9 **Windows survival guide:** The Windows Desktop, The Program Manager, Organizing the Desktop, The File Manager
   1.10 **Application software:** Using Application Software
   1.11 Windows Explorer, E-mails, Internet, Intranet, Extranets, Ethernet, HTTP
   1.12 Computer Viruses, Antivirus

2. Data Structure and Algorithms
   2.1 Fundamental of Data Structures, Abstract Data types,
   2.2 Lists, Linked Lists, Stacks,
   2.3 Queues, Priority Queue,
   2.5 Indexing Methods, Hashing Trees, Suffix Trees
   2.6 Worst-Case and Expected Time Complexity.
   2.7 Analysis of Simple Recursive and No Recursive Algorithms.
   2.8 Searching, Merging and Sorting.
   2.9 **Introductory Notions of algorithm design:** Divide-and-Conquer, Dynamic Programming, Greedy Methods, Backtracking
   2.10 Graph algorithms: Depth-first Search and Breadth-first Search, Shortest Path Problems, Minimum Spanning Trees, Directed Acyclic Graphs.

3. System Analysis and Design
   3.1 Defining the System, System Owner, System User, System Designers and system Builders, System Analysts, Variations on the System Analyst title, System life Cycle,
   3.2 **Joint Application Development (JAD):** JAD definition, JAD purpose, JAD Philosophy, JAD Scope,
   3.3 **Involved in a JAD:** Sponsor, Business Users, System Analyst
   3.4 **Roles of JAD Group Member:** Project Leader, Record Keeper, Time Keeper.
   3.6 **Concept formations:** Introduction, Finding the Problem, Evaluating the Proposal, Technical Feasibility, Operational Feasibility, Economic Feasibility.
   3.7 **Requirements analysis:** Representing System Analysis Model, Requirement Model, Design Model,
4. Operating Systems
4.1 Define an Operating System, Trace the Developments in Operating Systems, Identify the functions of Operating Systems,
4.2 Describe the basic components of the Operating Systems, Understand Information Storage and Management Systems,
4.3 List Disk Allocation and Scheduling Methods, Identify the Basic Memory Management strategies, List the Virtual Memory Management Techniques, Define a Process and list the features of the Process Management System
4.4 Identify the Features of Process Scheduling; List the features of Inter-Process Communication and Deadlocks,
4.5 Identify the Concepts of Parallel and Distributed Processing, Identify Security Threats to Operating Systems
4.6 Overview of the MS-DOS Operating System
4.7 Introduction to the Windows Family of Products, Unix Family of Products, Linux Family of Products.
4.8 Introduction to Windows Networking
4.9 Windows Architecture, Linux Architecture
4.10 Troubleshooting Windows, & Linux
4.11 Managing Network Printing
4.12 Managing Hard Disks and Partitions
4.13 Monitoring and Troubleshooting Windows
4.14 Users, Groups and Permission Linux and Windows.

5. Database Management System and Design
5.1 Introduction, A Database Model, Relational Database Model, Integrity, RDBMS.
5.2 SQL and Embedded SQL
5.3 Writing Basic SQL SELECT Statements
5.4 Restricting and Sorting data
5.5 Single Row Functions
5.6 Displaying Data from Multiple Tables
5.7 Aggregation Data Using Group Functions
5.8 Sub Queries, Manipulating Data and Creating &Managing Tables
5.9 Creating Views and Controlling User Access
5.10 Using Set Operators, Date time Function
5.12 Normalization: 1NF, 2NF, 3NF, BCNF, 4NF,5NF, DKNF
5.13 Architecture of DBMS: Client-server, Open Architectures, Transaction
5.14 Basic Concept of major RDBMS products: Oracle, Sybase, DB2, SQL Server and other Databases.

6. Programming Language
6.2 Fundamental Issues in Language Design.
6.3 Virtual Machines, Code Generation, Loop Optimization.
6.4 Concept of Procedural Programming, Structural Programming, Object-Oriented Programming.
6.5 Concept of C programming, C++ Programming,
6.6 Java Programming for Declaration, Modularity and Storage Management Software Development.

7. Networking
7.1 Basic Network Theory: Network Definition, Network Models, Connectivity, Network Addressing.
7.2 Network Connectivity: The Data Package, Establishing a Connection, Reliable Delivery, Network Connectivity, Noise Control, Building Codes, Connection Devices.
7.5 TCP/IP Services: Dynamic Host Configuration Protocol, DNS Name Resolution, NetBIOS support, SNMP, TCP/IP Utilities, FTP
7.6 Network LAN Infrastructure: LAN Protocols on a Network, IP Routing, IP Routing Tables, Router Discovery Protocols, Data Movement in a Routed Network, Virtual LANs(VLANS)
7.7 Network WAN Infrastructure: The WAN Environment, Wan Transmission Technologies, Wan Connectivity Devices, Voice Over Data Services
7.9 Computer Security: Computer Virus, Worm, Trojan Horse.
7.11 Disaster Recovery: The need for Disaster Recovery, Disaster Recovery plan, Data backup, Fault Tolerance.
7.12 Advanced Data Storage Techniques: Enterprise Data Storage, Clustering, Network Attached Storage, Storage Area Networks.
7.15 Network Access Points (NAP), Common Network Component, Common Peripheral Ports.

8. Computer Architecture & Organization
8.1 Evaluation of Computers, Design Methodology, Set Architecture, MIPS ISA, ALU Design.
8.2 Data path Design: Single and Multiple Cycle Implementations, Pipelining, Memory Hierarchy, Input/ Output System: Bus & Role of Operating System.

9. Compiler Design
9.1 Introduction to Compiling.
9.2 Logical Analysis, Syntax Analysis, Semantic Analysis,
9.3 Run Time environment,
9.4 Intermediate Code Generation, Code Optimization,
9.5 Compiler Generation Tools.

10. E-Commerce Technology
10.1 Introduction to E-Commerce.
10.2 Electronic Commerce Strategies.
10.3 Electronic Commerce Security Issues.
10.4 Success Models of E-Governance.
10.5 **E-Business:** b2b, b2c, h2e, c2c, g2g, g2c.
10.6 Principles of Electronic Payment, Strategies & Systems.
10.7 E-marketing, Reverse Engineering.
10.8 E-Banking, EDI Methods, SWIFT.
10.9 Encryption and Decryption Methods, XML, Layout Managers, Event Model.

### MIS and Web Engineering

11.1 Information Systems, Client-Server Computing.
11.2 Information Systems and Decision Making.
11.3 Database Design issues, Data Mining, Data Warehousing
11.4 Knowledge Management, The strategic use of Information Technology.
11.6 Software Supported Demonstrations including advanced Spreadsheet topics, Software Component Based Systems (CBSE),
11.7 Multimedia
11.8 Object-Oriented Programming with COMS & DECOMS,
11.9 Group Decision Support Systems
11.10 Basics of Website Design.

### IT in Nepal

12.1 History of IT in Nepal,
12.2 IT Policy of Nepal, 2067 B.S.
12.3 Electronic Transaction Act , 2063 B.S.
12.4 Copyright Act, 2059 B.S.
12.5 Uses of Computers and Software Development
12.6 Nepali Unicode, Nepali Fonts
12.3 Licensing Issues

### Data Center

13.1 Data Center fundamentals
13.2 Components of Data Center
13.3 Emerging technologies in Data Center

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**Note:**

- Medium of exam is Nepali or English or Both
- No Negative marks