सूचना प्रविधि अधिकृत पदको
परिक्षा योजना (Examination Scheme)

पाठ्यक्रमको रुपरेखाः यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छ।

प्रथम चरणः लिखित परिक्षा

अन्तिम चरणः (क) प्रयोगात्मक परीक्षा

(ख) अन्तर्वार्ता

प्रथम चरणः लिखित परिक्षा योजना

विषय	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या	समय
कम्प्युटर सम्बन्धी	५०	२०	(Objective)	(Multiple Choice)	५०*१	४५ मिनेट

अन्तिम चरण

विषय	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली	समय
प्रयोगात्मक परीक्षा	३०	१५	प्रयोगात्मक (Practical) ५ प्रश्न X ६ अंक	१ घण्टा
अन्तरवार्ता (Interview)	२०	-	मौखिक (Oral)	-

१. यो पाठ्यक्रम योजनालाई लिखित परिक्षा (प्रथम चरण), प्रयोगात्मक तथा अन्तरवार्ता (अन्तिम चरण) गरी दुई भागमा विभाजन गरिएको छ।

२. प्रश्नपत्र अंग्रेजी भाषामा हुनेछ ।

३. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा दुवै हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अंक कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस वापत अंक दिइने छैन र अंक कट्टा पनि गरिने छैन ।

५. परीक्षामा कुनै प्रकारको क्याल्कुलेटर, मोवाइल वा त्यस्तै प्रकारका विद्युतीय उपकरण प्रयोग गर्न पाइने छैन ।

६. लिखित परीक्षामा सोधिने प्रश्न संख्या यथासम्भवन देहाय अनुसार हुनेछ ।

एकाई	१	२	३	४	५	६	७	८	९	१०	११	१२
प्रश्न संख्या	५	४	५	५	७	३	५	१	१	३	५	६

७. प्रयोगात्मक परीक्षाका प्रश्न संख्या निम्नानुसार हुनेछन् ।

प्रयोगात्मक परीक्षाको एकाई	४	५	६	७
प्रश्न संख्या	१	२	१	१

८. लिखित परीक्षा र अन्तिम चरणको प्रयोगात्मक तथा अन्तरवार्ताको कुल अंक योगका आधारमा अन्तिम परीक्षाफल प्रकाशित गरिनेछ ।

सूचना प्रविधि अधिकृत पदको लिखित परीक्षा तथा प्रयोगात्मक परीक्षा चरणको पाठ्यक्रम

कम्प्युटर विषय सम्बन्धी

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, System unit, Starting the computer
   - 1.5 Input Devices: keyboard, mouse, other input devices
   - 1.6 Processing: CPU, Memory
   - 1.7 Storages devices: Overview of Storage Devices, Floppy Disk Drive, HardDrive, Universal Serial Bus (USB) Devices and Other Storage Devices
   - 1.8 Output devices: Monitors, Printers, Modems, Soundboards
   - 1.9 Dos survival guide: Using Command Prompt, Creating and using AUTOEXEC.BAT and CONFIG.SYS
   - 1.10 Windows survival guide: Windows Desktop, Program Manager, Organizingthe Desktop, File Manager
   - 1.11 Application software: Using Application Software
   - 1.12 Windows Explorer, E-mails, Internet, Intranet, Extranets, Ethernet, HTTP
   - 1.13 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,
   - 2.4 Trees: Traversal, Implementations, Binary Trees, Binary Search Trees,Balanced Search Trees, AVL Trees.
   - 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
   - 3.5 System Design Environment: Development Process, Management Process, System Structure, Balk Component of Computer based Information System, Personal/ Centralized/Distribution System.
   - 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,
   - 3.8 Development Process: Design Method

3.9 **Entity Relationship Diagram (E-R Diagram):** Notations, Entities: Strong Entities, Weak Entities, Attributes: Simple and Composite, Single Valued and Multiple Valued, Null and Derived Attribute.

3.10 **Relationship** Sets: Degree of Relationship and Cardinality Relationship, Specialization, Generalization, Aggregation.

3.11 **Data Flow Diagrams** (DFDs): Introductions, Data flow Diagram, Symbol, Files or data store, External entities, Data flows,

3.12 **Describing** System **by Data Flow Diagram:** Context diagram, Top level DFD, Expansion Level DFD, Conversions of Data.

3.13 **Object Modeling:** Object -Oriented Concept, Object Structure, Object Feature, Class and Object.

3.14 **Representation:** Association and Composition, Inheritance, Multiple Inheritances

3.15 **Modeling:** Use Case Diagram, State Diagram, Event Flow Diagram

3.16 **Documentation:** Automatic and Manual System

4. Operating Systems

4.1 Definition, Developments and Functions of Operating Systems,

4.2 Basic components of the Operating Systems, Understand Information Storage and Management Systems,

4.3 Disk Allocation and Scheduling Methods, Basic Memory Management strategies, Virtual Memory Management Techniques, Define a Process and the features of the Process Management System

4.4 Features of Process Scheduling; Features of Inter-Process Communication and Deadlocks,

4.5 Concepts of Parallel and Distributed Processing, 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, 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

5.11 Database Design: Logical Design, Conceptual Design, Mapping Conceptual to Logical, Pragmatic issues, Physical Design, Integrity and Correctness, Relational Algebra, Relational Calculus.

5.12 Normalization: INF, 2NF, 3NF, BCNF, 4NF,5NF, DKNF

5.13 Architecture of DBMS: Client-server, Open Architectures, Transaction Processing, Multi-User & Concurrency, and Backup & Recovery Database.

5.14 **Basic Concept of major** RDBMS **products:** Oracle, Sybase, DB2, SQL Server and other Databases.

6. Programming Language

6.1 Overview of Programming Language: History, Programming Paradigms, The role of Language translates in the Programming Process

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

7.3 **Advanced Network Theory:** The OSI model, Ethernet, Network Resources, Token ring, FDDI, Wireless Networking.

7.4 **Common** Network **Protocols:** Families of Protocols, NetBEUI, Bridge and Switches, TCP/IP Protocol, Building TCP/IP Network, TCP/IP Suite

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:** WAN Environment, Wan Transmission Technologies, Wan Connectivity Devices, Voice Over Data Services

7.8 **Remote Networking:** Remote Networking, Remote Access protocols, VPN Technologies

7.9 **Computer Security:** Computer Virus, Worm, Trojan Horse

7.10 **Network Security:** Introduction, Virus Protection, Local Security, Network Access, Internet Security.

7.11 **Disaster Recovery:** 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

7.13 **Network Troubleshooting:** Using Systematic Approach to Troubleshooting

7.14 **Network Support** Tools: Utilities, Network Baseline

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 **Datapath Design:** Single and Multiple Cycle Implementations, Pipelining, Memory Hierarchy, Input / Output System: Bus & Role of Operating System

9. Complier 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, b2e, c2c, g2g, 92c

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

11. 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.

11.5 Work Process Redesign (Reengineering) with Information Technology, Enterprise Resources Planning Systems, and Information Systems Security, Information Privacy, and Global Information Technology issues.

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

12. Legislations and IT in Nepal

12.1 The **Constitution of Nepal** (From Part 1 to 5, 13, 14, 15, 16, 17, 18, 19 & 20; and Schedules)

12.2 History of IT in Nepal,

12.3 IT Policy of Nepal, 2072 B.S.

12.4 Electronic Transaction Act, 2063 B.S.

12.5 Copyright Act, 2059 B.S.

12.d Uses of Computers and Software Development

12.7 Nepali Unicode, Nepali Fonts

12.8 Licensing Issues

12.9 Local Government Operation Act, 2074 (Provisions related to ICT)