पाठ्यक्रम को रूपरेखा :- यह पाठ्यक्रम को आधारभूत निम्नलिखित परीक्षा लिखने का प्रयास करता है।

प्रथम चरण :- लिखित परीक्षा पूर्णांक :- 150

d्वितीय चरण :- (क) प्रयोगात्मक पूर्णांक :- 10

(ख) अन्तर्वांति पूर्णांक :- 30

**प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)**

<table>
<thead>
<tr>
<th>पत्र</th>
<th>विषय</th>
<th>पूर्णांक</th>
<th>उत्तीर्णांक</th>
<th>परीक्षा प्रणाली</th>
<th>प्रश्न संख्या x अंक / मिनट</th>
<th>समय</th>
</tr>
</thead>
<tbody>
<tr>
<td>प्रथम</td>
<td>कम्प्युटर</td>
<td>100</td>
<td>40</td>
<td>वंसृगत वह उत्तर (Multiple Choice)</td>
<td>50 x 2 = 100</td>
<td>45 मिनट</td>
</tr>
<tr>
<td>द्वितीय</td>
<td>संबंधित विषय</td>
<td>50</td>
<td>20</td>
<td>प्रयोगात्मक (Subjective)</td>
<td>5 x 10 = 50</td>
<td>1 घण्टा 30 मिनट</td>
</tr>
</tbody>
</table>

(क) प्रयोगात्मक परीक्षा

<table>
<thead>
<tr>
<th>पत्र</th>
<th>विषय</th>
<th>पूर्णांक</th>
<th>उत्तीर्णांक</th>
<th>परीक्षा प्रणाली</th>
<th>प्रश्न संख्या x अंक / मिनट</th>
<th>समय</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ख) अन्तर्वांति</td>
<td>30</td>
<td>-</td>
<td>मौखिक</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. पाठ्यक्रम को प्रथम र द्वितीय पत्र तथा प्रयोगात्मक परीक्षा को विषयवस्तु एउटै हुनेछ।

2. प्रथम र द्वितीय पत्रको लिखित परीक्षा छूटाउँदै हुनेछ।

3. प्रथम पत्रमा वंसृगत बह उत्तर (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रयोग गरिएको उत्तर बापत २ (एक) अँड प्रश्न गरिएको भने गलत उत्तर दिएमा प्रयोग गलत उत्तर बापत २० प्रतिशत अधिक ०.४ अँड काठ गरिएको हो। तर उत्तर दिएमा ल्यस बापत अँड दिइएको छ र अँड काठ पनि गरिएको छ छ।

4. द्वितीय पत्रको विषयवस्तु प्रश्नका लागि तोलक्नुको १० अँडका प्रश्नहरूको हकमा १० अँडको एउटा लामो प्रश्न र एउटा प्रश्नका दुई बाट दुई भन्ना बढी भाग (Two or more parts of a single question) र एउटा प्रश्न अन्तर्गत दुई बाट बढी टिप्पणीहरू (Short notes) सौंफ सकिने छ।

5. द्वितीय पत्रको पाठ्यक्रमलाई ४ बाटा खण्ड/एकाइका विभाजन गरिएको छ। ४ बाटा खण्ड/एकाइको लागि ४ वटै उपस्थितिका दिइएको हो र परीक्षाजीभने प्रयोग खण्ड/एकाइका प्रश्नहरूको उत्तर सही खण्ड/एकाइको उत्तर पुनरक्रमात लेखिने पर्दछ।

6. यस पाठ्यक्रममा जेतूका लेिखिएको भएको पनि पाठ्यक्रममा परेका ऐना, नियमहरू परीक्षा को मिति भन्ना (तीन) माहिति अगाडि (संशोधन भएका र संशोधन भई हटाइएका र भए गरी संशोधन भई) कायम राखिएका हुने पाठ्यक्रम कति सम्मान पर्दछ।

7. प्रथम चरणको लिखित परीक्षाको छैनेटै भएका उमेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वांति सम्मालित गराइनेछ।
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 **Dos survival guide:** Using Command Prompt, Creating and using AUTOEXEC.BAT and CONFIG.SYS
   1.10 **Windows survival guide:** The Windows Desktop, The Program Manager, Organizing the Desktop, The 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 Nonrecursive 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,
   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 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, Datetime 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: 1NF, 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**

6.2 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.

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, b2e, 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.  
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.  
11.6 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. **IT in Nepal**  
12.1 History of IT in Nepal,  
12.2 IT Policy of Nepal, 2057 B.S.  
12.3 Cyber law of Nepal (Electronic Transaction Ordinance, 2061 B.S.)  
12.4 Copy Write Act, 2022 B.S.  
12.5 Uses of Computers and Software Development  
12.6 Nepali Unicode, Nepali Fonts  
12.7 Licensing Issues  
13. **स्थानीय निकायको प्रशासन**  
1. स्थानीय स्वायत्त शासन ऐन, २०७९  
2. स्थानीय स्वायत्त शासन नियमावली, २०७६  
  
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