

नेपाल बीमा प्राधिकरण

कुपण्डोल, ललितपुर

सेवा : नेपाल बीमा प्राधिकरण
समूह : प्रशासन
श्रेणी : अधिकृत द्वितीय
पद : उपनिर्देशक (सूचना प्रविधि)
परीक्षाको किसिम : खुला र आन्तरिक प्रतियोगितात्मक परीक्षा

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा पूर्णाङ्क :- ३००
द्वितीय चरण :- (क) मामिला प्रस्तुतीकरण पूर्णाङ्क :- २०
(ख) अन्तर्वार्ता पूर्णाङ्क :- ४०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा(Written Examination)

पूर्णाङ्क :- ३००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या × अङ्क	समय
प्रथम	Governance, management and Insurance	१००	४०	विषयगत	१० प्रश्न × १० अङ्क	३ घण्टा
द्वितीय	Technical Subject I	१००	४०	विषयगत	१० प्रश्न × १० अङ्क	३ घण्टा
तृतीय	Technical Subject II	१००	४०	विषयगत	१० प्रश्न × १० अङ्क	३ घण्टा

२. द्वितीय चरण :

विषय	पूर्णाङ्क	परीक्षा प्रणाली	समय
(क) मामिला प्रस्तुतीकरण (Case Presentation)	२०	व्यक्तिगत प्रस्तुतीकरण	३० मिनेट
(ख) अन्तर्वार्ता	४०	मौखिक	

द्रष्टव्य :

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- प्रथम, द्वितीय र तृतीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने प्रश्नसंख्या र अङ्कभार यथासम्भवसम्बन्धितपत्र/विषयमा दिईए अनुसार हुनेछ ।
- विषयगत प्रश्नहरूको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- प्रस्तुतिकरण (Presentation) परीक्षाको लागि उम्मेदवारलाई बीमासँग सम्बन्धित कुनै समसामयिक विषय/सवाल (Contemporary Issues) वा मामिला (Case) वा Topic उपलब्ध गराइनेछ । प्रत्येक उम्मेदवारले दिइएको Topic का विषयमा निर्दिष्ट समयभित्र व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ । यसको मूल्याङ्कन विषयवस्तु (Content), प्रस्तुतिको सुगठन वा ढाँचा (Organization) र प्रस्तुतिको प्रभावकारिता (Delivery Effectiveness) आधारमा हुनेछ ।
- पाठ्यक्रम लागु मिति : २०७९/०५/२९

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प्रथम पत्र - Governance, Management and Insurance

Section (A) : - 50 Marks

1. Governance and Management

- 1.1 Concept and principles of governance system
- 1.2 Auditing and Budgeting-principles of auditing and its practices, Capital Planning and Budgeting: Budget Preparation, Implementation, Monitoring and Evaluation
- 1.3 Governance of Banking and insurance
- 1.4 Public accountability, transparency
- 1.5 The foundational values for public service - integrity, impartiality, dedication, empathy, tolerance and compassion
- 1.6 Applications of public management for developing professionalism - Change management, Performance Management, Grievance management, Conflict management and Risk management.
- 1.7 Negotiation skills, method and significance of dispute settlement .
- 1.8 Leadership and communication
- 1.9 Supervision, Monitoring and Quality Control

2. Insurance Management: Structure of Insurance Regulatory Authority, management of Insurer, Prospectus and Challenges of Insurance Management, Role of insurance regulatory authority in the present context.

3. Project management and Financial analysis

- 3.1 Project Planning and Scheduling: Network models, CPM/PERT, Project preparation for implementation and justification
- 3.2 Financial analysis: Methods of financial analysis - benefit cost ratio, internal rate of return, net present value, and payback period
- 3.3 Logical Framework analysis and Project Proposal Writing

4. Research

- 4.1 Need and importance of Research and Development.
- 4.2 Data Analysis – Preparing and presenting data; Summarizing data – graphs and charts; Statistical analysis – descriptive and inferential, parametric and non-parametric; Analysis of qualitative data
- 4.3 ICT and its application in research work

Section (B) : - 50 Marks

5. Insurance

- 5.1 Introduction, Evolution and Development of Insurance
- 5.2 Types and Scope of Insurance
- 5.3 Principles of Insurance
- 5.4 Current Status of Nepal's Insurance Market
- 5.5 Insurance Mediators : Insurance Agent, Insurance Surveyor and Insurance Broker
- 5.6 Development Phases of Insurance and Banking in Nepal
- 5.7 Financial Projections and Financial Ratio Analysis

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- 5.8 Life Insurance, Non-Life Insurance and Reinsurance
- 5.9 Insurance Intermediaries: Insurance Agent, Insurance Surveyor and Insurance Broker
- 5.10 Role of Insurance in Development of National Economy
- 5.11 Insurance Management Information System
- 5.12 Insurance market supervision and regulations
- 5.13 Cross border business of insurance and its impact on insurance market

6. **Related laws**

- 6.1 Insurance Act, 2079 and Insurance Regulations, 1993
- 6.2 Directives issued by Nepal Insurance Authority
- 6.3 Company Act, 2063
- 6.4 Money Laundering Prevention Act, 2064
- 6.5 Public Procurement Act, 2063 and regulation, 2064
- 6.6 Copyright Act, 2059
- 6.7 Current ICT policy of Nepal
- 6.8 Digital Nepal framework
- 6.9 Electronic Transaction Act, 2063 and Regulation, 2064
- 6.10 Cyber law
- 6.11 ICT in current periodic plan
- 6.12 Broadband Policy, 2071
- 6.13 Public Procurement Act, 2063 and Regulation, 2064
- 6.14 Guidelines and Standards related to Government Enterprise Architecture
- 6.15 Information Technology Emergency Response Team (Operation and Management Guideline), 2075
- 6.16 Digital Nepal Framework
- 6.17 Roles of related Institutions
 - 6.17.1 Ministry of Communication and Information Technology
 - 6.17.2 Department of Information Technology
 - 6.17.3 National Information Technology Center and Government Integrated Data Center
 - 6.17.4 Office of the Controller of Certification

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द्वितीय पत्र - Technical Subject (I)

Section (A) - (50%)

[5 Questions X 10 Marks =50 Marks]

1. Computer Architecture and Organization

- 1.1. Basic Structures: Sequential Circuits, Design Procedure, State Diagram, and State Table, Von Neumann / Harvard Architecture, RISC/CISC Architecture, SISD, SIMD, MISD, MIMD, Addressing Methods and Programs, Representation of Data, Arithmetic Operations, Basic Operational Concepts, Bus Structures, Instruction, Cycle and Excitation Cycle
- 1.2. Processing Unit: Instruction Formats, Arithmetic and Logical Instruction, Addressing Modes and Formats
- 1.3. Input Output Organization: I/O programming, Memory Mapped I/O, Basic Interrupt System, DMA
- 1.4. Computer Arithmetic: Arithmetic and Logic Unit, Integer Arithmetic and Representation, Floating-Point Arithmetic
- 1.5. Memory Systems: Internal Memory, Cache Memory, Direct Memory Access, External Memory
- 1.6. CPU Structure and Function: Processor and Register Organization, Power PC Processor

2. Operating System

- 2.1. Definition, Development and Functions of Operating System (OS), Functional Architecture of OS, Types of OS, Network and distributed OS
- 2.2. Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Inter Process Communications, Semaphores. Features of Process Scheduling; List the features of Inter-Process Communication and Deadlock scheduling
- 2.3. Disk Allocation and Scheduling Methods, Basic Memory Management strategies, Virtual Memory Management Techniques, Define a Process and features of the Process Management System
- 2.4. Concepts of Parallel and Distributed Processing, Identify Security Threats to Operating Systems, authentication and access authorization, system flaws and attacks, trusted system
- 2.5. Input Output and Files: I/O devices and its organization, Principles of I/O software and hardware, Disks, Files and directories organization, File System Implementation, Interrupt handling
- 2.6. Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Cluster computing

3. Distributed System

- 3.1. Client server computing concepts: Building blocks, the state of distributed client server infrastructure
- 3.2. Fundamental models of Distributed System,
- 3.3. Distributed object based communications: RPC/RMI, CORBA
- 3.4. Synchronization in Distributed System (DS), physical/logical clocks (Cristian, Lamport, Vector clocks), Distributed Mutual Exclusion, Election in DS
- 3.5. Replication and Fault Tolerant, Recovery approach in DS,
- 3.6. Distributed file system (SUN-NFS, HDFS)
- 3.7. Distributed transaction and concurrency control methods
- 3.8. Distributed deadlock

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4. Web Technologies and Applications

- 4.1. Introduction: History; Internet and the Web; Client/server computing paradigm
- 4.2. Web basics: Web documents and browsers; HTML, XHTML, forms, CSS; Crawling and information retrieval on the web
- 4.3. Server-side Programming: Introduction to server-side scripting languages; Backend database programming; Multi-tier architecture
- 4.4. Client-side scripting: JavaScript basics; JavaScript DOM
- 4.5. Web applications: Content management systems; Web application frameworks; Online information systems and solutions
- 4.6. Web 2.0: Introduction; Blogs, wikis, social networking and collective intelligence; AJAX
- 4.7. Information representation and sharing – XML: XML documents, DTD; Stylesheets and transformation – XSLT; Information syndication - RSS
- 4.8. Web services: Service-oriented architecture; SOAP, WSDL, REST

5. Cloud Computing

- 5.1. Basics of Cloud Computing, Characteristics of cloud computing
- 5.2. Cloud, Fog, Edge computing comparisons, Cloud Federation
- 5.3. Data Storage and Security in the Cloud
- 5.4. Virtualization: virtual machines and container technologies
- 5.5. Ubiquitous Clouds and the Internet of Things
- 5.6. Future of Cloud Computing, Federated learning

Section (B) - (50%)

[5 Questions X 10 Marks =50 Marks]

6. Computer Network

- 6.1. Definition, OSI & TCP/IP reference model, Topologies, Client/Server Model & Peer2Peer Model
- 6.2. Network Components: Repeater, Hub, Bridge, Switch, and Router
- 6.3. Link Layer: Services, Flow and Error Control, error detection and correction, multiple access protocols (ALOHA, Slotted ALOHA), 802.3 Ethernet CSMA/CD, Token Bus, Token Ring, FDDI, Protocols: PPP, HDLC, Virtual circuit switching: Frame relay, ATM, X.25, MPLS
- 6.4. Network Layer: services, datagram and virtual circuits, routing principles and algorithms, Internet Protocols (IPv4/v6) header format, IPv4/v6 addressing and subnetting, VLSM, CIDR, ICMPv4/v6 error/information messages, Routing: interior/exterior routing, unicast/multicast routing, adaptive/non-adaptive routing. Routing protocols: RIP, OSPF, BGP, IS-IS
- 6.5. Transport Layer: Services, multiplexing and De-multiplexing, UDP, TCP, flow control, TCP sliding window, principles of congestion control, TCP congestion control, Open/close loop congestion control, Leaky bucket & Token Bucket algorithm, overview of socket programming, TCP/UDP Sockets
- 6.6. Upper layers: Application, presentation and session layer functionalizes; principles of WWW, DNS, DHCP, FTP; email protocols: SMTP/PoP/IMAP; PGP
- 6.7. Introduction to Latest networking: Software-Defined Networking, Software -Defined IPv6 (SoDIP6) Network, IPv6 network migration methods, SDN migration methods, IoT, NGN

7. Cyber Security Fundamentals

- 7.1. Basics of Information Security: Confidentiality, Integrity, Availability, Non-Repudiation, Security technologies

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- 7.2. Cyber Security and information security: cyber threats, vulnerabilities and risk, Digital Forensics, cyber warfare, hacking, Digital Right management, Cyber threats landscape in insurance and financial sector
- 7.3. Introduction to Cryptography and Network Security
- 7.4. Mobile Security & Common Vulnerabilities
- 7.5. Cyber security frameworks i.e., NIST- Cyber security Framework (CSF), ISO 27001 & 27002
- 7.6. Cyber Crime and Legal Issues
- 7.7. Ethics in Cybersecurity & Cyber Law
- 8. System Network and Application Security**
 - 8.1. Fundamental of network security: network protocols, Network attacks, Network security devices such as IDS, IPS, Firewall and its type, Firewall design, WAF, VPN, DMZ, NAT, Proxy Firewall, Wireless Security, Remote Access Security
 - 8.2. Authentication applications: Kerberos, electronic mail security, SSO
 - 8.3. OS Security: Patch management, Active Directory, Physical Security, Backup
 - 8.4. Identity and Access Management (IAM)
 - 8.5. Security Principles in software development lifecycle, Database Security
 - 8.6. Web server, Browser, SSL/TLS, SET, Email Security
 - 8.7. Example attack: Cross-site scripting, Cross-site request forgery, Out-of-bounds read, Input validation attack, Operating system (OS) command injection, SQL Injection, Use after free
- 9. IT Strategy**
 - 9.1. Strategic use of IT
 - 9.2. Porter 5 Forces model
 - 9.3. Long-term objectives
 - 9.4. The value disciplines
 - 9.5. Generic strategies
 - 9.6. Grand strategies
 - 9.7. Strategic analysis and choices
 - 9.8. Value chain analysis
 - 9.9. SWOT analysis
 - 9.10. Core competencies
 - 9.11. Strategy control and continuous improvement
 - 9.12. Strategy implementation
- 10. IT Project Management**
 - 1.1. Requirement engineering
 - 1.2. PERT / CPM network
 - 1.3. Investment analysis and breakeven analysis
 - 1.4. Time value of money
 - 1.5. Financial analysis
 - 1.6. Software estimation.
 - 1.7. Configuration management
 - 1.8. Team building approach
 - 1.9. Issue tracking and management
 - 1.10. Verification and validation
 - 1.11. Business process reengineering

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तृतीय : Technical Subject (II)

Section (A) - (50%)

[5 Questions X 10 Marks =50 Marks]

1. Data Structure and Algorithm

- 1.1. Fundamental of Data Structures, Abstract Data types
- 1.2. Stacks, Queues, Lists, Linked Lists
- 1.3. Trees: Traversal, Implementations, Binary Trees, Binary Search Trees, Balanced Search Trees, AVL Trees
- 1.4. Indexing Methods. Hashing Trees, Suffix Trees
- 1.5. Time and space complexity, Bog O' Notation
- 1.6. Analysis of Simple Recursive and Non-recursive Algorithms
- 1.7. Searching, Merging and Sorting, Divide-and-Conquer, Dynamic Programming, Greedy Methods, Backtracking
- 1.8. Graph algorithms: Depth-First Search and Breadth-first Search, Shortest Path Problems, Minimum Spanning Trees, Directed Acyclic Graphs

2. System Analysis and Design

- 2.1. Definition of the System, System Owner, System User, System Designers and system Builders, System Analysts, Variations on the System Analyst title, System development life Cycle
- 2.2. Prototyping: Spiral, Waterfall, Rapid Application Development (RAD), Joint Application Development (JAD)
- 2.3. System Design Environment: Concept formulations
- 2.4. Requirements analysis: Representing System Analysis Model, Requirement Model, Design Model
- 2.5. Fundamentals of Object oriented system analysis and design
- 2.6. Entity Relationship Diagram (E-R Diagram), Context Diagram, Data Flow Diagrams (DFDs), UML diagrams

3. Computer Programming

- 3.1. Overview of Programming Language: History, Programming Paradigms, The role of Language translates in the Programming Process
- 3.2. Fundamental Issues in Language Design
- 3.3. Virtual Machines, Code Generation, Loop Optimization
- 3.4. Concept of Procedural Programming, Structural Programming, Object-Oriented Programming
- 3.5. Fundamentals of C/C++ programming
- 3.6. Java Programming for Declaration, Modularity and Storage Management Software Development

4. Software Engineering

- 4.1. Software process: The software lifecycle models, risk-driven approaches
- 4.2. Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
- 4.3. Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review
- 4.4. Software design: Design for reuse, design for change, design notations, design

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evaluation and validation

- 4.5. Software Project Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
- 4.6. Software Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
- 4.7. Tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, ISO standards, SEI-CMM, CASE tools

5. Information System

- 5.1. Information Systems (IS) fundamentals: concept of IS; building blocks of IS; Classification and evolution of IS
- 5.2. Planning for Information System: Strategic, Tactical, and Operational Information System
- 5.3. Information System Development
- 5.4. Information System Implementation: Change Management, Critical Success Factors, Balanced Scorecard
- 5.5. Decision support system (DSS)
- 5.6. Enterprise Resource Planning (ERP)
- 5.7. Customer Relationship Management (CRM)
- 5.8. Supplier Relationship Management (SRM)
- 5.9. Management Information System (MIS)
- 5.10. Ethical and social aspects of Information System

Section (B) - (50%)

[5 Questions X 10 Marks =50 Marks]

6. Database Management System

- 6.1. Introduction, Database Model, Relational Database Model, Integrity, RDBMS
- 6.2. SQL and Embedded SQL
- 6.3. Writing Basic SQL queries (DDL, DML, DCL)
- 6.4. Restricting and Sorting Data
- 6.5. Sub Queries, Manipulating Data and Creating & Managing Tables
- 6.6. Creating Views and Controlling User Access
- 6.7. Using Set Operators, Date time Function
- 6.8. Relational Database Design, ER Diagram, Keys (primary, foreign, candidate, alternate keys)
- 6.9. Normalizations (1NF, 2NF, 3NF, BCNF, 4NF) and functional dependencies
- 6.10. Fundamentals of database servers, functions, procedures, triggers and rules
- 6.11. Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 6.12. Crash Recovery: Types of failure, Recovery techniques
- 6.13. Query Processing and Optimization
- 6.14. Indexing: Hash based indexing, Tree based indexing
- 6.15. Distributed Database Systems and Object-oriented database system

7. Data Mining and Warehousing

- 7.1. Data warehousing
 - 7.1.1. Need for data warehousing, trends in data warehousing
 - 7.1.2. Planning and requirement

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- 7.1.3. Architecture, infrastructure and metadata
- 7.1.4. Data design and representation (principals of dimensional modeling, data extraction, transformation and loading, data quality)
- 7.1.5. Information access and delivery (matching information to classes of users, OLAP in data warehousing, DW and web)
- 7.1.6. Implementation and maintenance (Physical design process, DW development, growth and maintenance)

7.2. Data mining

- 7.2.1. Data mining algorithms: Classification, clustering, association rules
- 7.2.2. Knowledge discovery: KDD process
- 7.2.3. Web mining: Web content mining, web structure mining, web using mining
- 7.2.4. Spatial and temporal mining
- 7.2.5. Visualization

8. E-Commerce and E-Governance

- 8.1. Introduction to E-Commerce and M-Commerce
- 8.2. Electronic Commerce Strategies
- 8.3. Electronic Commerce Security Issues
- 8.4. Types of E-Business and E-Governance Models
- 8.5. Fundamentals of E-Governance
- 8.6. E-Government life cycle
- 8.7. Infrastructure use in e-Governance
- 8.8. Electronic funds transfer, e-payment gateways, Electronic payment system (EPS), E-Banking, EDI Methods, SWIFT
- 8.9. Mobile Governance

9. Software Architecture

- 9.1. Introduction to software architecture: Architecture in the system development life-cycles; architectural dimensions; physical versus logical architecture
- 9.2. 13.2 Architectural view types and styles: Module viewpoints and styles, component and connector viewpoints and styles, allocation viewpoints and styles, architectures pattern and frameworks
- 9.3. Application architecture: Centralized vs. distributed architectures; distributed architectures including client server, peer to peer and push
- 9.4. Data architecture: Centralized vs. distributed database, relational vs. object oriented databases
- 9.5. Middleware technology: Remote procedure calls; object middleware including DCOM and CORBA; message oriented middleware
- 9.6. Web based architecture: Enterprise java beans architecture; Microsoft Dot Net architecture; Service Oriented Architecture (SOA)
- 9.7. Other architecture: Product line architecture; enterprise application integration architecture

10. AI and Machine Learning

- 10.1. Introduction
- 10.2. Problem Decomposition and Planning
- 10.3. Logic and Reasoning
- 10.4. Natural Language Processing and Artificial Neural Network
- 10.5. Machine Learning and pattern recognition