

नेपाल बीमा प्राधिकरण

कुपण्डोल, ललितपुर

सेवा :	नेपाल बीमा प्राधिकरण सेवा
समूह :	प्रशासन
श्रेणी :	अधिकृतस्तर तृतीय
पद :	सहायक निर्देशक(सूचना प्रविधि अधिकृत)
परीक्षाको किसिम :	खुला र आन्तरिक प्रतियोगितात्मक परीक्षा

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा

पूर्णाङ्क :- ३००

द्वितीय चरण - (क) सामूहिक परीक्षण

पूर्णाङ्क :- १०

(ख) अन्तर्वार्ता

पूर्णाङ्क :- ४०

Written Examination Scheme

Paper	Subject	Full Marks	Pass Marks	Examination System	No. of Questions x Marks	Time
Paper I	Information Technology - I	100	40	Objective	100 Questions X 1 marks	1 Hour 30 Minutes
Paper II	Information Technology - II	100	40	Subjective	10 Questions X 10 marks	3 Hours
Paper III	Technology, Governance and Management	100	40	Subjective	5 Questions X 10 Marks 10 Questions X 5 Marks	3 Hours

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 यथा सम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- परीक्षार्थीले वस्तुगत बहुवैकल्पिक प्रश्नको उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिकप्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- 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 । पाठ्यक्रम लागू मिति :

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Written Examination

Paper I - Information Technology - I

Full marks: 100

Pass Marks: 40

Time: 1 Hour 30 Minutes

Contents

- 1. Digital Logic** **10 Marks**
 - 1.1. Digital and Analog Systems.
 - 1.2. Number Systems.
 - 1.3. Logic Elements
 - 1.4. Combinational Logic Circuits
 - 1.5. Sequential Logic
 - 1.6. Arithmetic Circuits
 - 1.7. MSI Logic circuits
 - 1.8. Counters and Registers
 - 1.9. IC logic families
 - 1.10. Interfacing with Analog Devices
 - 1.11. Memory Devices

- 2. Computer Architecture and Organization** **10 Marks**
 - 2.1. Basic Structures : sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
 - 2.2. Addressing Methods and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction, cycle and excitation cycle.
 - 2.3. Processing Unit: instruction formats, arithmetic and logical instruction.
 - 2.4. Addressing modes
 - 2.5. Input Output Organization : I/O programming , memory mapped I/O, basic interrupt system, DMA
 - 2.6. Arithmetic Operations
 - 2.7. Memory Systems

- 3. Operating System** **10 Marks**
 - 3.1. Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
 - 3.2. Scheduling
 - 3.3. Memory Management
 - 3.4. 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
 - 3.5. Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters
 - 3.6. Security : Authentication and Access Authorization, System Flaws and Attacks, Trusted system

- 4. Computer Networks** **10 Marks**
 - 4.1. Protocol stack, OSI and TCP/IP models
 - 4.2. Link Layer: services, error detection and correction, multiple access protocols, LAN addressing and ARP (Address Resolution Protocol), Ethernet,

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CSMA/CD multiple access protocol, Hubs, Bridges, and Switches, Wireless LANs, PPP (Point to Point Protocol), Wide area protocols

- 4.3. Network Layer :services, datagram and virtual circuits, routing principles and algorithms, Internet Protocol (IP), IP addressing, IP transport, fragmentation and assembly, ICMP (Internet Control Message Protocol), routing on the internet, RIP (Routing Information Protocol), OSPF (Open Shortest Path First), router internals, IPv6)
- 4.4. Transport Layer: principles, multiplexing and de-multiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control
- 4.5. Application Layer : Web and Web caching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming

5. Data Structure and Algorithms 10 Marks

- 5.1. General concepts : Abstract data Type, Time and space analysis of algorithms, Big oh and theta notations, Average, best and worst case analysis
- 5.2. Linear data structures
- 5.3. Trees: General and binary trees, Representations and traversals, Binary search trees
- 5.4. Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, Divide and conquer, Dynamic programming, Recursion
- 5.5. Hashing
- 5.6. Graphs and digraphs
- 5.7. Sorting algorithms

6. Computer Programming 10 Marks

- 6.1. Concept of Procedural Programming, Structural Programming, Object-Oriented Programming.
- 6.2. Data types, Abstract Data Types (ADT)
- 6.3. Operators, variables and assignments, control structures
- 6.4. Procedure/function
- 6.5. Class definitions, encapsulation, inheritance, object composition, polymorphism
- 6.6. Concept of C programming, C++ Programming

7. Database Management System 10 Marks

- 7.1. Introduction: The relational model, ER model
- 7.2. Structured Query Language
- 7.3. Functional dependency, normalization and relational database design
- 7.4. Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 7.5. Crash Recovery : types of failure, Recovery techniques
- 7.6. Query Processing and Optimization
- 7.7. Indexing : Hash based indexing, Tree based indexing
- 7.8. Distributed Database Systems and Object oriented database system
- 7.9. Database Security

8. Web Technology 10 Marks

- 8.1. Introduction to Web Technology: Internet, Intranet, WWW, Static and Dynamic Web Page; Web Clients; Web Servers; Client Server Architecture: Single Tier, Two-Tier,

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Multi-Tier; HTTP: HTTP Request and Response; URL, Client Side Scripting, Server Side Scripting, Web 2.0

- 8.2. Hyper Text Markup Language: Introduction to HTML; Elements of HTML Document; HTML Elements and HTML Attributes, Headings, Paragraph, Division, Formatting; Image element; Anchors; Lists; Tables; Frames; Forms
- 8.3. Client Side Scripting with JavaScript
- 8.4. Basics of AJAX; Introduction to XML and its Application

9. Software Engineering

10 Marks

- 9.1. Software process: The software lifecycle models, risk-driven approaches
- 9.2. Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
- 9.3. Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review, feasibility analysis
- 9.4. Software design: Design for reuse and with reuse, design for change, design notations, design evaluation and validation
- 9.5. Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
- 9.6. Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
- 9.7. SE issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, ISO standards, SEI-CMM, CASE tools

10. Theory of Computation

10 Marks

- 10.1. BNF, Languages, grammars
- 10.2. DFA and NFA, regular expressions, regular grammars
- 10.3. Closure, homomorphism
- 10.4. Pigeonhole principle, pumping lemma
- 10.5. CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs
- 10.6. Turing machines
- 10.7. Recursively enumerable languages Unrestricted grammars
- 10.8. The Chomsky hierarchy, Undecidable problems, Church's Thesis
Complexity Theory, P and NP

Note: The distribution of multiple choices questions (MCQs) across the topics will be as per the following scheme.

Topics	Questions x Marks
Digital Logic	10 Questions x 1 Mark
Computer Architecture and Organization	10 Questions x 1 Mark
Operating System	10 Questions x 1 Mark
Computer Networks	10 Questions x 1 Mark
Data Structure and Algorithms	10 Questions x 1 Mark

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Computer Programming	10 Questions x 1 Mark
Database Management System	10 Questions x 1 Mark
Web Technology	10 Questions x 1 Mark
Software Engineering	10 Questions x 1 Mark
Theory of Computation	10 Questions x 1 Mark

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Written Examination

Paper II: Information Technology - II

Full marks: 100

Pass Marks: 40

Time: 3 Hours

Contents

Section A (50 %)

- 1. Digital Logic** **10 Marks**
 - 1.1. Digital and Analog Systems.
 - 1.2. Number Systems.
 - 1.3. Logic Elements
 - 1.4. Combinational Logic Circuits
 - 1.5. Sequential Logic
 - 1.6. Arithmetic Circuits
 - 1.7. MSI Logic circuits
 - 1.8. Counters and Registers
 - 1.9. IC logic families
 - 1.10. Interfacing with Analog Devices
 - 1.11. Memory Devices

- 2. Computer Architecture and Organization** **10 Marks**
 - 2.1. Basic Structures : sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
 - 2.2. Addressing Methods and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction, cycle and excitation cycle.
 - 2.3. Processing Unit: instruction formats, arithmetic and logical instruction.
 - 2.4. Addressing modes
 - 2.5. Input Output Organization : I/O programming , memory mapped I/O, basic interrupt system, DMA
 - 2.6. Arithmetic Operations
 - 2.7. Memory Systems

- 3. Operating System** **10 Marks**
 - 3.1. Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
 - 3.2. Scheduling
 - 3.3. Memory Management
 - 3.4. 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
 - 3.5. Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters
 - 3.6. Security : Authentication and Access Authorization, System Flaws and Attacks, Trusted system

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4. Computer Networks

10 Marks

- 4.1. Protocol stack, OSI and TCP/IP models
- 4.2. Link Layer: services, error detection and correction, multiple access protocols, LAN addressing and ARP (Address Resolution Protocol), Ethernet, CSMA/CD multiple access protocol, Hubs, Bridges, and Switches, Wireless LANs, PPP (Point to Point Protocol), Wide area protocols
- 4.3. Network Layer :services, datagram and virtual circuits, routing principles and algorithms, Internet Protocol (IP), IP addressing, IP transport, fragmentation and assembly, ICMP (Internet Control Message Protocol), routing on the internet, RIP (Routing Information Protocol), OSPF (Open Shortest Path First), router internals, IPv6)
- 4.4. Transport Layer: principles, multiplexing and de-multiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control
- 4.5. Application Layer : Web and Web caching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming

5. Data Structure and Algorithms

10 Marks

- 5.1. General concepts : Abstract data Type, Time and space analysis of algorithms, Big oh and theta notations, Average, best and worst case analysis
- 5.2. Linear data structures
- 5.3. Trees: General and binary trees, Representations and traversals, Binary search trees
- 5.4. Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, Divide and conquer, Dynamic programming, Recursion
- 5.5. Hashing
- 5.6. Graphs and digraphs
- 5.7. Sorting algorithms

Section B (50%)

6. Computer Programming

10 Marks

- 6.1. Concept of Procedural Programming, Structural Programming, Object-Oriented Programming.
- 6.2. Data types, Abstract Data Types (ADT)
- 6.3. Operators, variables and assignments, control structures
- 6.4. Procedure/function
- 6.5. Class definitions, encapsulation, inheritance, object composition, polymorphism
- 6.6. Concept of C programming, C++ Programming

7. Database Management System

10 Marks

- 7.1. Introduction: The relational model, ER model
- 7.2. Structured Query Language
- 7.3. Functional dependency, normalization and relational database design
- 7.4. Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 7.5. Crash Recovery : types of failure, Recovery techniques
- 7.6. Query Processing and Optimization
- 7.7. Indexing : Hash based indexing, Tree based indexing
- 7.8. Distributed Database Systems and Object oriented database system
- 7.9. Database Security

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8. Web Technology

10 Marks

- 8.1. Introduction to Web Technology: Internet, Intranet, WWW, Static and Dynamic Web Page; Web Clients; Web Servers; Client Server Architecture: Single Tier, Two-Tier, Multi-Tier; HTTP: HTTP Request and Response; URL, Client Side Scripting, Server Side Scripting, Web 2.0
- 8.2. Hyper Text Markup Language: Introduction to HTML; Elements of HTML Document; HTML Elements and HTML Attributes, Headings, Paragraph, Division, Formatting; Image element; Anchors; Lists; Tables; Frames; Forms
- 8.3. Client Side Scripting with JavaScript
- 8.4. Basics of AJAX; Introduction to XML and its Application

9. Software Engineering

10 Marks

- 9.1. Software process: The software lifecycle models, risk-driven approaches
- 9.2. Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
- 9.3. Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review, feasibility analysis
- 9.4. Software design: Design for reuse and with reuse, design for change, design notations, design evaluation and validation
- 9.5. Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
- 9.6. Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
- 9.7. SE issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, ISO standards, SEI-CMM, CASE tools

10. Theory of Computation

10 Marks

- 10.1. BNF, Languages, grammars
- 10.2. DFA and NDFA, regular expressions, regular grammars
- 10.3. Closure, homomorphism
- 10.4. Pigeonhole principle, pumping lemma
- 10.5. CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs
- 10.6. Turing machines
- 10.7. Recursively enumerable languages Unrestricted grammars
- 10.8. The Chomsky hierarchy; Undecidable problems; Church's Thesis
- 10.9. Complexity Theory, P and NP

Note: The distribution of questions across the topics will be as per the following scheme.

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Topics	Questions x Marks
Digital Logic	1 Question x 10 Marks
Computer Architecture and Organization	1 Question x 10 Marks
Operating System	1 Question x 10 Marks
Computer Networks	1 Question x 10 Marks
Data Structure and Algorithms	1 Question x 10 Marks
Computer Programming	1 Question x 10 Marks
Database Management System	1 Question x 10 Marks
Web Technology	1 Question x 10 Marks
Software Engineering	1 Question x 10 Marks
Theory of Computation	1 Question x 10 Marks

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Written Examination

Paper III: Technology, Governance and Management

Full marks: 100

Pass Marks: 40

Time: 3 Hours

Contents

Section A (50 %)

1. Information Systems

10 Marks

- 1.1. Information systems fundamentals
- 1.2. Information systems building blocks
- 1.3. Management Information System
- 1.4. Decision support system
- 1.5. Enterprise Resource Planning
- 1.6. Customer Relationship Management
- 1.7. Supplier Relationship Management

2. Cyber Security

10 Marks

- 2.1. Introduction to Cyber Security
- 2.2. Common security threats: Social engineering; Distributed Denial of Services; Malwares: Phishing, Spyware, Viruses, Worms, Trojans, etc.
- 2.3. Identity and Access Management
- 2.4. Security Engineering: Firewalls, Router/switch security, IDS and IPS, Email Filtering, Vulnerability Scanning, Host based Security tools (use of antivirus software)
- 2.5. Cryptography: Encryption and decryption; Hashing; Digital Signature
- 2.6. Application Security
- 2.7. Business Continuity Planning
- 2.8. Introduction to Security Standards: ISO 27001
- 2.9. Electronic Transaction Act, 2063

3. ICT Project Management

10 Marks

- 3.1. Requirement engineering.
- 3.2. PERT / CPM network.
- 3.3. Investment analysis and breakeven analysis.
- 3.4. Time value of money.
- 3.5. Financial analysis.
- 3.6. Software estimation.
- 3.7. Configuration management.
- 3.8. Team building approach.
- 3.9. Issue tracking and management.

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3.10. Verification and validation.

3.11. Business process reengineering.

10 Marks

4. e-Governance and e-Commerce

4.1. History of e-Governance development

4.2. e-Governance working principles,

4.3. Models of e-Governance

4.4. Infrastructure use in e-Governance

4.5. Mobile Governance

4.6. E-Government life cycle

4.7. Global trading environment & adoption of e-Commerce

4.8. Online service delivery and electronic service delivery

4.9. Electronic funds transfer, e-payment gateways, Electronic payment system (EPS)

4.10. Current ICT policy of Nepal

4.11. Current periodic plan related to ICT

10 Marks

5. Introduction to advanced topics in ICT

5.1. Artificial Intelligence and Machine Learning

5.2. Data Mining and Data Warehousing

5.3. Parallel and distributed computing

5.4. High speed networks

5.5. Software Architecture

5.6. Cloud Computing

5.7. Big Data Analytics

5.8. Internet of Things (IoT)

Section B (50 %)

6. Management

15 Marks

6.1. Concepts of management and its principles

6.2. Communications and leadership

6.3. Decision making process and negotiation skills

6.4. Organization and development

6.5. Ethics and integrity in professional life

6.6. Human resource management

6.7. Research and development

7. Insurance in Nepal

20 Marks

7.1. Introduction, Evolution and Development of Insurance

7.2. Types Insurance- Life Insurance, Non-Life Insurance, Reinsurance, and Micro insurance

7.3. Insurance Mediators : Insurance Agent, Insurance Surveyor and Insurance Broker

7.4. Role of Insurance in Development of National Economy

7.5. Insurance Management Information System

7.6. Frauds in insurance

7.7. Insurance market supervision

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- 7.8. Major characteristics and challenges of international insurance market
- 7.9. Cross border business of insurance and its impact on insurance market
- 7.10. Current Status of Nepal's Insurance Market

8. Related Legislations and Institutions 15 Marks

- 8.1. Constitution of Nepal
- 8.2. Insurance Act, 2079
- 8.3. Public procurement act 2063 and regulation 2064(related to procurement of goods and
- 8.4. Insurance Regulation, 2049
- 8.5. Nepal Insurance Authority Employee Service Regulation 2068
- 8.6. Directives issued by Insurance Board
- 8.7. Objectives, role and functions of insurance board
- 8.8. IAIS - International Association of Insurance Supervisors

Note: The distribution of questions across the topics will be as per the following scheme.

Topics	Questions x Marks
Information Systems	1 Question x 10 Marks
Cyber Security	1 Question x 10 Marks
IT Project Management	1 Question x 10 Marks
e-Governance and e-Commerce	1 Question x 10 Marks
Introduction to Advanced Topics in IT	1 Question x 10 Marks
Management	3 Question x 5 Marks
Insurance in Nepal	4 Question x 5 Marks
Related Legislations and Institution	3 Question x 5 Marks