



नेपाल सरकार

स्वास्थ्य बीमा बोर्ड

स्वास्थ्य सेवा, तह ढ, आइटी-डेभलपर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:- यस पाठ्यक्रमको आधारमा निम्नानुसारका चरणमा परीक्षा लिइने छ :

प्रथम चरण :- अन्तर्वार्ता

पूर्णाङ्क :- ४०

परीक्षा योजना (Examination Scheme)

विषय	पूर्णाङ्क	परीक्षा प्रणाली	समय
व्यक्तिगत अन्तर्वार्ता	४०	मौखिक	-

पाठ्यक्रमका विषयवस्तु:

1. Digital Design and Computer Architecture

1.1. Digital Design

- 1.1.1. Digital and Analog Systems
- 1.1.2. Number Systems
- 1.1.3. Logic Elements
- 1.1.4. Combinational Logic Circuits
- 1.1.5. Sequential Logic
- 1.1.6. Arithmetic Circuits
- 1.1.7. MSI Logic Circuits
- 1.1.8. Counters and Registers
- 1.1.9. IC logic families
- 1.1.10. Interfacing with Analog Devices
- 1.1.11. Memory Devices

1.2. Computer Architecture

- 1.2.1. Basic Structures: Sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
- 1.2.2. Addressing Methods and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction cycle and excitation cycle
- 1.2.3. Processing Unit: instruction formats, arithmetic and logical instruction
- 1.2.4. Addressing modes
- 1.2.5. Input Output Organization: I/O programming, memory mapped I/O, basic interrupt system, Direct Memory Access (DMA)
- 1.2.6. Arithmetic Operations
- 1.2.7. Memory Systems

2. Operating System

- 2.1. Processes and Threads: Symmetric Multiprocessing, Microkernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
- 2.2. Scheduling
- 2.3. Memory Management
- 2.4. 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
- 2.5. Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters
- 2.6. Security: Authentication and Access Authorization, System Flaws and Attacks, Trusted system

3. Computer Networks

- 3.1. Protocol stack, OSI and TCP/IP models
- 3.2. 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
- 3.3. Network Layer: services, datagram and virtual circuits, routing principles and algorithms, Internet Protocol (IP), IP addressing, IP transport, fragmentation and assembly, ICMP



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(Internet Control Message Protocol), routing on the internet, RIP (Routing Information Protocol), OSPF (Open Shortest Path First), router internals, IPv6

- 3.4. Transport Layer: principles, multiplexing and demultiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control
- 3.5. Application Layer: Web and Web caching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming

4. Structured and Object-Oriented Programming

- 4.1. Concept of Procedural Programming, Structural Programming, Object Oriented Programming
- 4.2. Data types, Abstract Data Types (ADT)
- 4.3. Operators, variables and assignments
- 4.4. Control structures
- 4.5. Procedure/function
- 4.6. Class definitions, encapsulation, inheritance, object composition, polymorphism
- 4.7. Concept of C programming, C++ Programming

5. Database Management System

- 5.1. The relational model, ER model
- 5.2. Structured Query Language (SQL)
- 5.3. Functional dependency, normalization and relational database design,
- 5.4. Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 5.5. Crash Recovery: types of failure, Recovery techniques
- 5.6. Query Processing and Optimization
- 5.7. Indexing: Hash based indexing; Tree based indexing
- 5.8. Distributed Database Systems and Object-oriented database system
- 5.9. Data Mining and Data Warehousing
- 5.10. Database Security

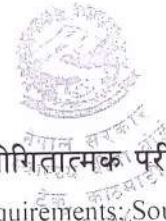
6. Software Engineering

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

7. Multimedia System, MIS and Web Engineering

7.1. Multimedia System

- 7.1.1. Introduction: Global structure of Multimedia; Medium; Multimedia System and properties
- 7.1.2. Sound / Audio System: Concept of Sound System; Music and Speech; Speech Generation, Speech Analysis, Speech Transmission
- 7.1.3. Images and Graphics: Digital Image representation; Image and Graphics Format; Image Synthesis, analysis and transmission
- 7.1.4. Video and Animation: Video signal representation, computer video format; computer-based animation



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7.1.5. Data Compression: Storage Space: Coding Requirements; Source, Entropy and Hybrid Coding; Lossy Sequential DCT- based Mode; Expanded Lossy DCT-based Mode: JPEG and MPEG

7.2. MIS and Web Engineering

- 7.2.1. Information Systems and Decision Making; Knowledge Management.
- 7.2.2. The strategic use of Information Technology; Work Process Redesign (Reengineering) with Information Technology; Enterprise Resources Planning Systems
- 7.2.3. Information Systems Security, Information Privacy, and Global Information Technology issues
- 7.2.4. 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
- 7.2.5. 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
- 7.2.6. Client-Side Scripting with JavaScript
- 7.2.7. Basics of AJAX: Introduction to XML and its Application

8. Theory of Computation, Data Structure and Algorithms

8.1. Theory of Computation

- 8.1.1. DFA and NDFA, regular expressions, regular grammars
- 8.1.2. CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs
- 8.1.3. Turing machines
- 8.1.4. Recursively enumerable languages Unrestricted grammars
- 8.1.5. The Chomsky hierarchy, Undecidable problems, Church's Thesis
- 8.1.6. Complexity Theory, P and NP

8.2. Data Structure and Algorithms

- 8.2.1. General concepts: Abstract data Type, Time and space analysis of algorithms, Big oh and theta notations, Average, best- and worst-case analysis
- 8.2.2. Linear data structures
- 8.2.3. Trees: General and binary trees, Representations and traversals, Binary search trees, balancing trees, AVL trees, 2-3 trees, red-black trees, self-adjusting trees, Splay Trees
- 8.2.4. Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, Divide and conquer, Dynamic programming, Recursion
- 8.2.5. Hashing
- 8.2.6. Graphs and digraphs
- 8.2.7. Sorting

9. Artificial Intelligence and Advanced Topics in IT

9.1. Artificial Intelligence

- 9.1.1. Search: Uninformed search techniques- depth first search, breadth first search, depth limit search, and search strategy comparison; Informed search techniques-hill climbing, best first search, greedy search
- 9.1.2. Learning: Supervised Learning; Unsupervised Learning; Semi-supervised Learning; Reinforcement Learning; Neural Networks; Support Vector Machine (SVM); Self Organizing Map (SOM); Genetic Algorithms; Clustering; Decision Trees.
- 9.1.3. Automated reasoning: FOPL; Knowledge Representation Languages. Basic Concepts of Natural Language Processing (NLP)
- 9.1.4. Game Playing



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9.2. Advanced Topics in IT २०१६

- 9.2.1. Parallel and distributed computing
- 9.2.2. High speed networks
- 9.2.3. Software Architecture
- 9.2.4. Cryptography and network security
- 9.2.5. E-commerce
- 9.2.6. Software Project Management
- 9.2.7. Cloud Computing
- 9.2.8. Big Data Analytics
- 9.2.9. Internet of Things (IoT)
- 9.2.10. Machine Learning

10. Related Legislation and Institutions

- 10.1. सूचना तथा सञ्चार प्रविधि नीति, २०७२
- 10.2. विद्युतीय कारोबार ऐन, २०६३
- 10.3. स्वास्थ्य बीमा ऐन, २०७४ र नियमावली, २०७५.
- 10.4. विपन्न कार्यक्रम अन्तर्गत दिइँदै आएका कडा रोगहरुको उपचार खर्च स्वास्थ्य बीमामा आवद्ध गर्ने कार्यविधि २०७८.
- 10.5. स्वास्थ्य बीमा बोर्ड र यसले संचालन गरेको E-MIS सम्बन्धी जानकारी.
- 10.6. सूचना तथा सञ्चार प्रविधि संग सम्बन्धित प्रमुख निकायका भूमिकाहरु: सञ्चार तथा सूचना प्रविधि मन्त्रालय, सूचना प्रविधि विभाग, नेपाल दूरसञ्चार प्राधिकरण, राष्ट्रिय सूचना प्रविधि केन्द्र (सरकारी एकिकृत डाटा सेन्टर) ।
- 10.7. स्वास्थ्य बीमा बोर्डको डाटा रास्ट्रीय परिचय पत्र संग आवद्धता सम्बन्धी जानकारी
