सामाजिकसुरक्षाकोष

सेवा : विविध, समुह : कम्प्युटर इन्जिनियरिङ, तह : ७, पद : सहायक - निर्देशकको खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परीक्षा लिइने छ :

प्रथम चरण :– लिखित परीक्षा — पूर्णाङ्कः– २००
द्वितीय चरण :– अन्तर्वार्ता — पूर्णाङ्कः– ३०

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या× अङ्कभार	समय
प्रथम	कम्प्युटर इन्जिनियरिङ, सम्बन्धी बिषय	१००	४०	वस्तुगत बहुउत्तर (Multiple Choice)	१००×१= १००	१ घण्टा ३० मिनेट
द्वितीय		१००	४०	विषयगत(Subjective)	४×५ =२० ७×१०=७० १×१० = १०	३ घण्टा

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	३०	मौखिक

१.लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
२. पाठ्यक्रमको प्रथम र द्वितीय पत्रको विषयवस्तु एउटै हुनेछ ।
३. प्रथम र द्वितीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
४. प्रथम तथा द्वितीय पत्रका एकाईहरुको प्रश्न संख्या निम्नानुसार हुनेछ :

प्रथम पत्रका एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13	14
प्रश्न संख्या	8	6	3	7	7	7	8	8	7	8	8	8	5	10
द्वितीय पत्रका एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13	14
अंकभार	7	5	5	7	7	7	7	7	7	7	7	7	5	5+10

५. प्रथम पत्रमा वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत १ (एक) अङ्क प्रदान गरिनेछ भने गलतउत्तर दिएमा प्रत्येक गलतउत्तर बापत २० प्रतिशत अर्थात् ०.२ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अंङ्क कट्टा पनि गरिने छैन ।

६. द्वितीय पत्रको विषयगत प्रश्नका लागि तोकिएको ७अङ्कका प्रश्नहरुको हकमा एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

७ यस पाठ्यक्रममा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका ऐन, नियमहरु परीक्षाको मितिभन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधनभई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।

८.प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीयचरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।

९.पाठ्यक्रम लागू मिति - २०७६।०२।१५

प्रथम र द्वितीयपत्र :– कम्प्युटर इन्जिनियरिङ सम्बन्धी विषय

1. **Computer Networks**

    1.1 Protocol stack, switching
    1.2. 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
    1.3. 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)
    1.4. Transport Layer: principles, multiplexing and demultiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control
    1.5. Application Layer: Web and Web caching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming)
    1.6. Distributed system, Clusters General concept of IT planning.

2. Structured and object-oriented programming

    2.1 Data types, ADT
    2.2 Operators, variables and assignments, control structures
    2.3 Procedure/function

2.4 Class definitions, encapsulation, inheritance, object composition,Polymorphism
2.5 Pattern and framework

3. Artificial Intelligence

3.1 Search
3.2 Natural Language Processing
3.3 Game Playing
3.4 Learning
3.5 Automated reasoning
3.6 Planning
3.7 Vision and Robotics

4. Data structures

4.1 General concepts: Abstract data Type, Time and space analysis of algorithms, Big oh andtheta notations, Average, best and worst-case analysis
4.2 Linear data structures
4.3 Trees: General and binary trees, Representations and traversals, Binarysearch trees, balancing trees, AVL trees, 2-3 trees, red-black trees, self-adjusting trees, Splay Trees
4.4 Algorithm design techniques: Greedy methods, Priority queue search,Exhaustive search, Divide and conquer, Dynamic programming, Recursion
4.5 Hashing
4.6 Graphs and digraphs
4.7 Sorting

5. Computer Architecture &Organization and Micro-processors

5.1 Basic Structures: sequential circuits, design procedure, state table and state diagram, VonNeumann / Harvard architecture, RISC/CISC architecture
5.2 Addressing Methods and Programs, representation of data, arithmeticoperations, basic operational concepts, bus structures, instruction, cycle andexcitation cycle.
5.3 Processing Unit: instruction formats, arithmetic and logical instruction.
5.4 addressing modes
5.5 Input Output Organization: I/O programming, memory mapped I/O, basicinterrupt system, DMA
5.6 Arithmetic
5.7 Memory Systems
5.8 808X and Intel microprocessors: programming and interfacing

6. Digital Design

    6.1 Digital and Analog Systemsm, Number Systems.
    6.2 Logic Elements
    6.3 Combinational Logic Circuits
    6.4 Sequential Logic
    6.5 Arithmetic Circuits
    6.6 MSI Logic circuits
    6.7 Counters and Registers
    6.8 IC logic families
    6.9 Interfacing with Analog Devices
    6.10 Memory Devices

7. Software Engineering

    7.1 Software process: The software lifecycle models, risk-driven approaches
    7.2 Software Project management: Relationship to lifecycle, project planning, project control,project organization, risk management, cost models,configuration management, version control, quality assurance, metrics
    7.3 Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static anddynamic specifications,requirements review.
    7.4 Software design: Design for reuse, design for change, design notations, design evaluation and validation
    7.5 Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
    7.6 Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
    7.7 Software Engineering (SE) issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, International Organization for Standardization (ISO)standards, Software Engineering Institute Capability Maturity Model (SEI-CMM), Computer-Aided Software Engineering (CASE) Tools.

8. Database Management System

    8.1 Introduction: The relational model, ER model, SQL, Functional dependency and relational database design, File structure
    8.2 Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
    8.3 Crash Recovery: types of failure, Recovery techniques
    8.4 Query Processing and Optimization
    8.5 Indexing: Hash based indexing, Tree based indexing
    8.6 Distributed Database Systems and Object-oriented database system

8.7 Data Mining and Data Warehousing
8.8 Security Management System

9. Operating System

9.1 Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock.
9.2 Scheduling
9.3 Memory Management
9.4 Input Output and Files: I/O devices and its organization, Principles of I/Osoftware and hardware, Disks, Files and directories organization, File SystemImplementation.
9.5 Distributed Systems: Distributed Message passing, RPC, Client/ServerComputing, Clusters.
9.6 Security: Authentication and Access Authorization, System Flaws andAttacks, Trusted system

10. Management Information System (MIS) and Web Engineering

10.1 Information Systems, Client-Server Computing.
10.2 Information Systems and Decision Making.
10.3 Database Design issues
10.4 Knowledge Management, The strategic use of Information Technology.
10.5 Work Process Redesign (Reengineering) with Information Technology, Enterprise Resources Planning Systems, Information Systems Security, Information Privacy, and Global Information Technology issues.
10.6 Software Supported Demonstrations including advanced Spreadsheet topics, Software Component Based Systems (CBSE),
10.7 Multimedia
10.8 Object-Oriented Programming with COMS & DECOMS,
10.9 Group Decision Support Systems
10.10 Basics of Website Design.

11. E-Commerce Technology

11.1 Introduction to E-Commerce.
11.2 Electronic Commerce Strategies.
11.3 Electronic Commerce Security Issues.
11.4 Success Models of E-Governance.
11.5 E-Business: b2b, b2c, b2e, c2c, g2g, g2c.
11.6 Principles of Electronic Payment, Strategies & Systems.
11.7 E-marketing, Reverse Engineering.
11.8 E-Banking, Electronic data interchange (EDI) Methods, SWIFT.
11.9 Encryption and Decryption Methods, XML, Layout Managers, Event Model.

12. System Analysis and Design Project Management

12.1 Defining the System, System Owner, System User, System Designers and system Builders, System Analysts, Variations on the System Analyst title, System life Cycle,
12.2 The System Design Environment: Development Process, Management Process, System Structure, Basic Component of Computer based Information System, Personal/ Centralized/Distribution System.
12.3 Concept formations: Introduction, Finding the Problem, Evaluating the Proposal, Technical Feasibility, Operational Feasibility, Economic Feasibility.
12.4 Requirements analysis: Representing System Analysis Model, Requirement Model, Design Model,
12.5 Development Process: Design Method.
12.6 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.
12.7 Relationship Sets: Degree of Relationship and Cardinality Relationship, Specialization, Generalization, Aggregation.
12.8 Data Flow Diagrams (DFDs): Introductions, Data flow Diagram, Symbol, Files or data store, External entities, Data flows,
12.9 Describing System by Data Flow Diagram: Context diagram, Top level DFD, Expansion Level DFD, Conversions of Data.
12.10 Object Modeling: Object -Oriented Concept, Object Structure, Object Feature, Class and Object.
12.11 Representation: Association and Composition, Inheritance, Multiple Inheritances.
12.12 Modeling: Use Case Diagram, State Diagram, Event Flow Diagram.

13. IT in Nepal

13.1 History of IT in Nepal
13.2 National Information and Communication Technology Policy,2015
13.3 Electronic Transaction Act, 2063 B.S.
13.4 Copyright Act, 2059 B.S.
13.5 Nepali Unicode, Nepali Fonts

14. Social Security Fund

14.1 Introduction to Social Security Fund
14.2 Vision, Mission and Objectives of Social Security Fund
14.3 Organizational Structure of Social Security Fund
14.4 नेपालको सं वधान २०७२
14.5 सामाजिक सुरक्षाको अवधारणा
14.6 योगदानमा आधारित सामाजिक सुरक्षा ऐन, २०७४
14.7 योगदानमा आधारित सामाजिक सुरक्षा नियमावली, २०७५
14.8 सामाजिक सुरक्षा कोषको (कर्मचारी प्रशासन) वनियमावली, २०७५

14.9 सामाजिक सुरक्षा योजना संचालन कार्य व ध, २०७७

14.10 रोजगारदाता र श्र मकको सु चकरण सम्बन्धी कार्य व ध, २०७७

14.11 श्रम ऐन, २०७४

14.12 श्रम नियमावली, २०७७

14.13 बोनस ऐन, २०३०

14.13 बोनस नियमावली, २०३९

14.14 कोषको रकम (वा णज्य बैंकहरुमा) लगानि गर्ने कार्य व ध, २०७७

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