1. Introduction
   1.1 General concept of IT planning
   1.2 Importance of IT in national development
   1.3 Social and cultural aspects of IT
   1.4 Global information superhighway

2. Software Engineering
   2.1 Software development life cycle
   2.2 Software process model
   2.3 Software project management
   2.4 Requirement analysis & requirement engineering
   2.5 Business process re-engineering
   2.6 System, data and process modeling
   2.7 Software testing
   2.8 Software quality assurance, validation & verification
   2.9 Software quality standards: ISO, SEI, CASE Tools
   2.10 Software cost estimation

3. Computer Architecture & Organization
   3.1 Instruction set architecture.
   3.2 CPU design and architecture.
   3.3 Memory hierarchy.
   3.4 Input / Output system.
   3.5 CISC vs. RISC

4. Operating Systems
   4.1 Components of the Operating Systems
   4.2 Processes
   4.3 IPC and deadlocks
   4.4 Memory management
   4.5 Input / Output and files
   4.6 Scheduling
   4.7 Different types of OS (UNIX, LINUX, WINDOWS)
   4.8 Distributed Operating System
   4.9 Security issues

5. Information Systems
   5.1 Information systems fundamentals
   5.2 Information system development
   5.3 Decision support system
   5.4 ERP, CRM and SRM
   5.5 Management Information System (MIS)
       5.5.1 MIS & its importance in organization
       5.5.2 Information technology infrastructure
       5.5.3 Application of MIS
       5.5.4 Ethical & social impact of IS
6. **Computer Networks**
   - 6.1 Network fundamentals
   - 6.2 OSI model
   - 6.3 Network protocols
   - 6.4 TCP/IP services (DNS, SNTP, FTP, DHCP, etc)
   - 6.5 Network infrastructures (LAN and WAN including IEEE 802. standards)
   - 6.6 VAN and remote access
   - 6.7 Internet and WWW
   - 6.8 Distributed system
   - 6.9 Privacy and security issues

7. **Database Management System**
   - 7.1 Database model
   - 7.2 SQL
   - 7.3 Functional dependency
   - 7.4 Database design
   - 7.5 Transaction management and concurrency control
   - 7.6 Query processing and optimization
   - 7.7 Normalization
   - 7.8 DBSC architecture
   - 7.9 Basic concept of major DBSC products (Oracle, DB2, Sybase, MSSQL server, etc)

8. **IT Strategy**
   - 8.1 Strategic use of IT
   - 8.2 Porter 5 Forces model
   - 8.3 Formulating long-term objectives
     - 8.3.1 Long-term objectives
     - 8.3.2 Generic strategies
     - 8.3.3 The value disciplines
     - 8.3.4 Grand strategies
   - 8.4 Strategic analysis and choices
   - 8.5 Value chain analysis
   - 8.6 SWOT analysis
   - 8.7 Core competencies
   - 8.8 Strategy control and continuous improvement
   - 8.9 Strategy implementation

9. **E-Commerce Technology**
   - 9.1 Introduction to E-Commerce
   - 9.2 Business models of E-Commerce
   - 9.3 Electronic data interchange
   - 9.4 Mobile commerce
   - 9.5 Technology for online business
   - 9.6 Business applications of E-Commerce
   - 9.7 Electronic payment system
   - 9.8 Security issues of E-Commerce
   - 9.9 PKI and digital signature
   - 9.10 Encryption and decryption methods
10. E-Government
   10.1 E-government model
   10.2 Managing E-government
   10.3 E-Government readiness
   10.4 E-Government infrastructure development
   10.5 Security for E-Government
   10.6 E-Government strategy
   10.7 Managing public data
   10.8 Emerging issues of E-Government
   10.9 Implementing E-Government
      10.9.1 E-Government system life cycle and project assessment
      10.9.2 Analysis of current reality
      10.9.3 Design of new E-Government system
      10.9.4 E-Government risk assessment and mitigation
      10.9.5 E-Government system construction implementation and beyond
   10.10 Nepalese E-Government initiative and E-Government master plan of Nepal
   10.11 Government enterprise architecture and government portal
   10.12 Government integrated data center
   10.13 Disaster recovery center
   10.13 Focal agencies for E-Government (NITC, HLCIT, OCCA, etc)

11. Data warehouse & data mining
   11.1 Data warehousing
      11.1.1 Need for data warehousing, trends in data warehousing
      11.1.2 Planning and requirement
      11.1.3 Architecture, infrastructure and metadata
      11.1.4 Data design and representation (principals of dimensional modeling, data extraction, transformation and loading, data quality)
      11.1.5 Information access and delivery (matching information to classes of users, OLAP in data warehousing, DW and web)
      11.1.6 Implementation and maintenance (Physical design process, DW development, growth and maintenance)
   11.2 Data mining
      11.2.1 Data mining algorithms: Classification, clustering, association rules
      11.2.2 Knowledge discovery: KDD process
      11.2.3 Web mining: Web content mining, web structure mining, web using mining
      11.2.4 Spatial and temporal mining
      11.2.5 Visualization

12. Project Management
   12.1 Requirement engineering.
   12.2 PERT / CPM network.
   12.3 Investment analysis and breakeven analysis.
   12.4 Time value of money.
   12.5 Financial analysis.
   12.6 Configuration management.
   12.8 Team building approach.
   12.9 Issue tracking and management.
13. **Software Architecture**

13.1 Introduction to software architecture
   13.1.1 Architecture in the system development life-cycles; architectural dimensions; physical versus logical architecture

13.2 Architectural view types and styles
   13.2.1 Module viewpoints and styles, component and conntector viewpoints and styles, allocation viewpoints and styles, architectures pattern and frameworks

13.3 Application architecture
   13.3.1 Centralized vs. distributed architectures; distributed architectures including client server, peer to peer and push

13.4 Data architecture
   13.4.1 Centralized vs. distributed database, relational vs. object oriented databases

13.5 Middleware technology
   13.5.1 Remote procedure calls; object middleware including DCOM and CORBA; message oriented middleware

13.6 Web based architecture
   13.6.1 Enterprise java beans architecture; Microsoft Dot Net architecture; Service Oriented Architecture (SOA)

13.7 Other architecture
   13.7.1 Product line architecture; enterprise application integration architecture