Operating Systems
(BCIS: 5th Semester)

Course Contents

Unit 1: Introduction **5 Hours**

OS concepts (brief history), Importance and functions of OS, Concepts of Uniprogramming, Multiprogramming, and Parallel Programming, Evolution of OS, Types of OS: Sequential, Batch, Multiprogramming (multitasking), Multiprocessing (multiprocessor), Time Sharing, Real Time, Distributed, Embedded, Kernel, OS architectures (structures): Monolithic, Microkernel, Layered, Client-server, Virtual machine, Operating System services: System calls, Shell commands, Shell programming, OS Examples: DOS, UNIX, Linux, MS-Windows, Handheld OS etc

Unit2: Process and Thread Management **6 Hours**

Introduction to Process: Process description, Process states, Process Control Block (PCB), Threads, Process vs Threads, Scheduler and its types: Short term, Medium term and Long term, Scheduling and its types: preemptive and non-preemptive, Process Scheduling algorithms: FCFS, SJF, SRTF, RR, Priority, HRN, Multi-level, Multi-level Feedback, Thread Scheduling, Multiprocessor scheduling concepts

Unit 3: Inter Process Communication and Synchronization **6 Hours**

Introduction to IPC, Process Communication Mechanisms: Message Passing, Remote Procedure Call (RPC), Shared Resource (Memory), Resource sharing, Concurrent process, Critical region, Race condition, Solution of race condition: Mutual exclusion, Mutual exclusion algorithms: Locks, Test and Set Lock (TSL), Peterson's algorithms, Semaphore, and Mutex, Monitor, Process Synchronization

Classical problems of Process Synchronization: Readers-Writers Problem, Producer-Consumer Problem, Sleeping Barber Problem, Dining Philosopher Problems

Unit 4: Deadlock **5 Hours**

Process Deadlock, Reusable, Consumable Resources, Causes (Conditions) of Deadlock: Mutual Exclusion, Hold and Wait, No Preemption, and Circular Wait, Deadlock Handling, Prevention, Avoidance: Ostrich Algorithm, Bankler's Algorithm, Detection, Recovery, Others issues: Database deadlock, Communication deadlock, Livelock, Starvation

Unit 5: Memory Management **7 Hours**

Concepts of memory and its hierarchy, Memory address: Logical and Physical address, Concept of swapping, Managing Free Memory Space: First Fit, Best Fit, Next Fit, and Worst Fit, Coalescing and Compaction, Memory Management Techniques, Contigious: Resident Monitor, Multiprogramming with fixed and variable partition, Non-Contigious: Paging, Segmentation, Paging with segmentation, Demand Paging, Virtual Memory Management, Page Replacement Algorithms: FIFO, NRU, LRU, Clock, Optimal, Thrashing

Unit 6: Input/Output Management and Disk Scheduling **5 Hours**

I/O Devices, I/O Techniques: Programmed I/O, Interrupt-driven I/O, and Direct Memory Access (DMA), Principle I/O hardware: I/O devices, Device controllers, DMA, I/O software: Polling, Interrupt, I/O software layer, Disk, Formatting, Arm scheduling algorithms: FCFS, SSTF, Elevator (Scan), C-Scan, Look, C-Look

Unit 7: File System Management **4 Hours**

File Naming, File Organization and access, File Directories and paths, File Sharing, Record Blocking, File system implementation: Contigious, linked-list, linked list with table, I-nodes,

Secondary File Storage Management, Examples: CD ROM file system, MS DOS file system, Unix file system

Unit 8: Security **4 Hours**

Security issues, Types of attacks, Security policy and Access control, Basics of cryptography: Encryption and Decryption, Protection mechanisms, Authentication, OS design considerations for security

Unit 9: Distributed Operating System **6 Hours**

Introduction to distributed system and distributed operating system, Goals and objectives, Distributed operating system (DOS) vs Network operating system (NOS), DOS as middleware, Communication in distributed system: client-server, RPC, and group communication, Mutual exclusion, Clock synchronization algorithm, Election algorithm

Lab works:

Different lab works related to normal OS and distributed OS in Windows, and Linux OS.

Text Books:

- Stalling William, "Operating Systems 6th Edition, Pearson Education, ISBN 978-81-317-2528-3
- Andrew S. Tanenbaum ,Modern Operating Systems, 3/E, ISBN-13: 9780136006633, PHI

Reference Books:

- Milan Milenkovic "Operating Systems Concepts and Design ", ISBN 9780074632727, TMGH
- Silbcrschatz A.,Galvin P., Gagne G.,"Operating System Concepts 8e",John Wiley and Sons,2003,ISBN 9812-53-055-X.
- M. J. Bach, “The Design of The Unix Operating System”, ISBN: 978-81-203-0516-8, PHI.
- Charles Crowley, “Operating Systems : A Design-oriented Approach” ISBN: 0074635514 TMH.

CMP 267 Data Communications and Networks
(BCIS: 5th Semester)

Course Contents:

Unit 1: Data Communication Fundamental **5 hours**

Introduction, Block diagram, Data components, Simplex, Duplex, Half Duplex, Signal: Analog and Digital Modulation and its types, Multiplexing and its types, Data representation: Line coding, Transmissions impairments

Unit 2: Introduction to Computer Network **5 hours**

Definition, Uses of network, Types of networking: LAN, WAN, MAN, Extra-Net, Intra-Net, Inter-Net, Networking Model: Client-Server, Peer-to-peer model, Active model, Protocols and Standards, Connection-Oriented and Connectionless Protocol, OSI Reference Model and TCP/IP Model, Comparison of OSI and TCP/IP Model, Example network: X.25, Frame Relay, NGN and MPLS

Unit 3: Physical Layer and its Design issues **6 hours**

Introduction, design issues and duties of physical layer, Transmission media: Guided: Twisted Pair, Coaxial, Fiber optic. Unguided: Electromagnetic spectrum, Line of Sight, Satellite, Wireless LAN IEEE 802.11 standards. Bandwidth and Data Rate, Switching: Circuit switching, Packet switching. Devices: Hub, Repeaters

Unit 4: Data Link Layer **6 hours**

Services, Framing, Error Control: detection and Correction, Flow Control Elementary Data link protocol, Sliding Window Protocol, Go Back N, Selective Repeat. Example of Data Link Protocol: HDLC, PPP. The Medium Access Control Sub-layer, Multiple access protocol Devices: Switches, Bridges

Unit 5: Network Layer **12 hours**

Network layer and its Design issues, Devices: Routers, Gateway. Virtual Circuit and Datagrams Switching, Routing: Static vs. Dynamic, Routing algorithms: Shortest path algorithm, Flooding, Distance vector routing, Link state routing. Congestion Control algorithm: Leaky Bucket and Token Bucket. Internet Protocol: IPv4 frame format, IP Addresses and Classes, Subnetting and Subnet mask. Introduction to IPv6, frame format, addressing, transition from IPv4 to IPv6: Dual stack, Tunneling and Header Translation.

Unit 6: Transport Layer **3 hours**

Services provided to upper layer, Transport protocols: TCP, UDP, SCTP, Ports and Sockets

Unit 7: Application Layer **3 hours**

DHCP, DNS, HTTP, SMTP, PROXY, FTP, Example of Clients and Servers Tools

Unit 8: Network Management and Network Security **6 hours**

Network Management: Introduction, Components & Internet Management Framework.
Network Security: Introduction, Goals. Attacks and countermeasures: Mapping, Packet sniffing, spoofing, Denial-of-Service Attacks and Hijacking. Cryptography: Symmetric Key and Public Key. Network layer security: IPsec, VPN. Wireless LAN Security: WEP, WPA. Firewalls

Unit 9: Cloud Networking **2 hours**

Introduction, concepts of cloud networking, Network virtualization

Laboratory:

- Network cabling and LAN setup

- Computer Networking on Windows Based Platform (Commands and Tools use)
- Computer Networking on Unix Based Platform (Commands and Tools use)
- Installation and Configuration of Different Types of Servers
- User of Traffic Analyzer
- Implement Network Security and Policies

Reference Books:

- Behrouz A. Forouzan, *Data Communication and Networking,* McGraw Hill Education
- Andrew S. Tanenbaum: *Computer Networks,* PHI
- Neil Jenkins and Stan Schatt: *Understanding Local Area Networks,* PHI
- W. Stalling, *Data and Computer Communication,* Macmillan Press
- Kurose & Ross, *Computer Networking: A top down approach,* Pearson Eduaction

CMP 363 Advanced Programming (JAVA)

BCIS, 5th Semester

Course Contents

Unit I: Introducing the AWT **3 hours**

- AWT classes
- Window fundamentals
- Component
- Container
- Panel
- Window
- Frame

- Working with frame Windows:
  - Setting the Windows dimensions
  - Setting a Windows title
  - Hiding and showing
  - Closing a Frame Windows

Unit II: Using AWT controls, Layout Managers, and Menus **6 hours**

- AWT Control Fundaments
- Adding and removing controls
- Responding to controls
  - Labels, buttons, checkboxes, CheckboxGroup Choice, Lists, Scroll bars, textfield, testarea,
- Understanding Layout managers
  - FlowLayout, BorderLayout, GridLayout, CardLayout, GridBadLayout
- Menus Bars and Menus, Dialog boxes, FileDialog boxes

Unit III: Event handling **6 hours**

- Two event handling mechanisms
- The delegation event model
  - Events
  - Event sources
  - Event listeners
  - Event classes
    - ActionEvent class, Adjustment Event class, ContainerEvent class, FocusEvent class, ItemEvent class, MouseEvent class, KeyEvent class, TextEvent class, WindowEvent class
- Sources of Events
- Events Listener Interfaces
  - ActionListener, Adjustment Listener, Container Listener, FocusListener, ItemListener, MouseListner, KeyListner, TextListener
- Using Delegation event model
- Handling mouse events
- Handling keyboard events
- Handling ActionEvent of all components
- Adapter classes, inner classes

Unit IV: Introducing Swing 3 hours

- The origins of swing, swing is built on the AWT

- Two Key Swing Features
- The MVC connection
- Components and containers

Unit V: Exploring Swing: **3 hours**

- JLabel and ImageIcon. JTextField, JButtons, checkboxes, radio buttons, JTabbedPane, JList, JComboBox, JTable
- Two typesof applets

Unit VI: The Applet Class **4 hours**

- Applet basics
- The Applet class
- Applet Architecture
- An applet skeleton
- The HTML applet tag
- Passing parameters to applets

Unit VII: JDBC
6 hour

- Database Basics
- Structured Query Language
    - Creating a table
    - Inserting Data
    - Updating records in table
    - Retrieving record in table
    - Retrieving records from table
    - Deleting records

- Database Driver
    - JDBC-ODBC bridge
    - Party Java Partly Native Driver
    - International Database Access Driver Server

- JDBC API
    - Creating a table
    - Inserting Data in Driver
    - Reading Data
    - Deleting Data
    - Prepared Statement

Unite VIII: Introduction to J2EE
3 hour

- Core J2EE Technologies
- Enterprise Application Architecture
    - 2-Tier Architecture
    - 3-Tier Architecture
    - N-Tier Architecture
    - Enterprise Architecture
- J2EE Application Service

Unite IX: Servlet Programming 7 hour

- HTTP
  - Get Request
  - POST Request
- Server Slide of the Web Application
- Web Container
  - Structure of a web application
- Servlet Technology
  - Servlet
- Deployment Description
- Step for writing a servlet
- Servlet initialization
- Reading HTML form data
- Session Management
  - Creating session
  - Storing data in session
  - Reading the data from session
  - Destroying the session
- Request dispatching
  - The forward()method
  - The include()method

Unit X: JSP programming 7 hour

- JSP Basic
  - JSP Directive
  - JSP Declaration

- Implicit Objects
- Java Beans in JSP
  - Jsp:useBEan
  - Jsp:setProperty
  - Jsp:getProperty

Basic Text

Kosuri Phani**,** *Java & J2EE Made Easy*, North Carolina: Lulu Publications.

Reference

Herbert Schildt, *Java the complete reference*, New Delhi: Mcgraw-Hill Education.

FIN 133 Fundamentals of Financial Management

BCIS, 5th Semester

Course Concept

Unit I: Financial Management and Its Environment ***6*** **hours**

Nature of financial management; Finance functions; Role of the financial managers; financial goals; Form of organizations; and an overview of financial institution and markets.

Unit II: Financial statement and analysis **6 hours**

Understanding financial statements: Income statement, Cash flow statement and balance sheet; Common size balance sheet; Ratio analysis: Short-term solvency measures, Long-term solvency measure, Asset management measure, Profitability measures, Market value measures, The DuPont identity; Use and Limitation of financial ratios.

Unit III: Time Value of Money **6 hours**

Concept of time value of money; Present values and discounting; Future values and compounding; Annuities and perpetuities; Effective interest rate and average percentage return; Application of time value of money in hospitality industry.

Unit IV: Raising Capital **7 hours**

Short-term versus long-term loan; Bonds: meaning, types, Bond innovation; preferred stock; Common stock: equity account in balance sheet, Right and privileges of common stockholders; Cost and benefit of debt versus equity; Methods of selling securities; Initial public offerings; Concept and functions of investment bankers; Concept of venture capitals; and concept of lease financing.

Unit V: Cost of Capitals **4 hours**

Concept of cost of capitals; Component cost of capital: Debt, Preferred stock. Common stock Retained earnings; Weighted average cost of capital, Application of cost of capitals in financial decision making in hospitality industry.

Unit VI: Capital Budgeting **6 hours**

Concept of capital budgeting; Types of projects; Capital budgeting techniques – payback period, NPV, IRR, Comparison on NPV with IRR, and profitability index; and application of capital budgeting techniques.

Unit VII: Capital structure **4 hours**

Concept of capital structure and financial structure; Setting target capital structure; Factors affecting capital structure; Business risk and financial risk; Operating and financial leverage.

Unit VIII: Dividend Decision **4 hour**

Concept of dividend; Cash dividend versus stock dividend; Dividend payment process; Stock dividend and stock split.

Unit IX: Working Capital Management **5 hour**

Concept and component of working capital; Importance of work capital management; Types of working; Factors affecting working capitals; and working capital flow cycle.

Basic Texts

Ross, S. A., Westerfield, R. W., & Jorda, B. D. *Fundamentals of corporate financial*. New Delhi: Tata McGraw-Hill.

Reference

▪ Gapenski, L. C. *Healthcare finance: an introduction to according and financial management*. Chicago: Health Administration Press

MKT 241 Principles of Marketing
(BCIS: 6th Semester)

Course Contents

Unit I: Marketing and Marketing Environment 12 hours

Introduction to Marketing and Marketing Management: Meaning of marketing; Evolution of the Marketing philosophies (marketing concepts); Basic principles of the marketing concept and holistic marketing concept. Meaning and tasks of marketing management.

Marketing in the Contemporary World: Marketing challenges of the 21st century and firms' responses to the challenges; Concept, relevance and practices of relationship marketing, green marketing, e-marketing, pyramid (C2C) marketing and rural marketing.

Marketing Mix: Components of the marketing mix for products and services.

Marketing Environment: Meaning and scope of marketing environment; Micro environment variables, and Macro environment variables; Reactive and proactive marketing. Marketing environment in Nepal.

Unit II: Marketing Information System and Buyer Behavior 10 hours

Marketing Information System: Concept and relevance; Components of the marketing information system; Marketing research areas and process.

Buyer Behavior: Organizational buyer behavior – Buying process and influencing factors. Consumer behavior – buying process and influencing factors. Consumer movement and consumer protection.

Unit III: Segmentation, Targeting and Positioning Strategies 4 hours

Segmentation: Concept, process and requirements; levels of segmentation; bases for segmenting consumer and organizational markets.

Targeting: Segment evaluation, analysis and selection.

Positioning: Concept and types of positioning; product positioning process.

Unit IV: Product, Pricing, Distribution and Promotion Strategies 22 hours

Product: Concept and levels of the product; product classifications; Product life cycle stages and strategies; New product development process; Branding strategies – branding objectives, types of brand, and concept of brand equity; Packaging: functions and levels of packaging; essentials of a good package; Product line and mix strategies; Service product strategies: service marketing concept, characteristics of services and marketing strategies; management of people, physical evidences, and process.

Pricing: Concept of price and pricing; Importance of pricing; Internal and external price factors; Pricing approaches – cost-based, demand-based, value-based and competition-based approaches; New product pricing; price lining, price adjustments, initiating and responding to price changes.

Distribution: Concept and objectives; Channel functions; Channel designs for consumer and industrial products; Channel selection factors; Channel conflicts and their resolution. Marketing logistics: Concept, nature and objectives; major logistics functions – transportation, warehousing, inventory management, order processing, and customer services decisions.

Promotion: Concept; Marketing communication process and systems; promotion mix components; promotion mix determination factors. Advertising: Nature and objectives; Advertising budgeting approaches; Adverting message design factors; Advertising media selection factors. Personal Selling: Nature and relevance of personal selling; Types of personal selling. Sales Promotions: Nature and objectives; Sales promotion tools and techniques. Public Relations: Nature and objectives; tools of public relations. Direct marketing: Concept and relevance; Methods of direct marketing.

Basic Texts

Kotler, Philip, Gary Armstrong, Prafulla Agnihotri and Ehsan ul Haque. *Principles of Marketing: South Asian Perspective.* New Delhi: Prentice Hall of India.

Baines, Paul, Chris Fill and Kelly Page. *Essentials of Marketing.* New Delhi: Oxford University Press.

References

Koirala, K.D. *Principles of Marketing*: Kathmandu: Buddha Academic Publications.

Kamarulzaman, Yusniza and Nor Khalidah Abu. *Principles of Marketing*: New Delhi: Oxford University Press.