

BCIS 5th Semester - Syllabus

CMP 361 Operating Systems BCIS, 5th Semester

Course Objectives

The main objective of the course is to provide students with an understanding of fundamental concepts of operating systems.

Other objectives are to make students understand:

- the services provided by and the design of an operating system
- the structure and organization of the file system
- what a process is and how processes are synchronized and scheduled
- different approaches to memory management

The course also aims to familiarize students to understand system calls for managing processes, memory and the file system management.

Course Description

The students will become familiar with the basics of operating systems and the feature controlling of modern operating system. The course helps in providing general understanding of structure of modern computers, purpose, structure and functions of operating systems with illustration of key OS aspects by examples.

Course Outcomes

By the end of the course you should be able to

- describe the general architecture of computers;
- describe, contrast and compare differing structures for operating systems; and
- understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files.

Course Contents

Unit I: 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

Unit II: 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 III: 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 IV: 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, Banker's Algorithm, Detection, Recovery, Others issues: Database deadlock, Communication deadlock, Livelock, Starvation

Unit V: 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, Contiguous: Resident Monitor, Multiprogramming with fixed and variable partition, Non-Contiguous: Paging, Segmentation, Paging with segmentation, Demand Paging, Virtual Memory Management, Page Replacement Algorithms: FIFO, NRU, LRU, Clock, Optimal, Thrashing

Unit VI: 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 VII: File System Management**4 hours**

File Naming, File Organization and access, File Directories and paths, File Sharing, Record Blocking, File system implementation: Contiguous, 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 VIII: 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 IX: 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.

Basic Texts

1. William, S. *Operating Systems*. Delhi: Pearson Education.
2. Tanenbaum, A. S. *Modern Operating Systems*. New Delhi: Prentice Hall of India.

References

1. Milenkovic, Milan. *Operating Systems Concepts and Design*. New Delhi: Tata McGraw Hill.
2. Silberschatz A, G. P., & Gagne, G. *Operating System Concepts*. New York: John Wiley and Sons.
3. Bach, M. J. *The Design of The Unix Operating System*. New Delhi: Prentice Hall of India.
4. Crowley, C. *Operating Systems: A Design-oriented Approach*. New Delhi: Tata McGraw Hill.

CMP 362 Data Communications and Networks
BCIS, 5th Semester

Course Objectives

This course aims to provide the study of computer systems, data communications and computer networks. The course includes different kinds of networking topologies and their structure and design. This course also covers the telecommunication system, electronic mail, data flows, networking protocols, and organization around ISO-OSI seven-layer architecture, with review of each layer.

Course Description

This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols. The course is supplemented by practical components.

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

- independently understand basic computer network technology;
- understand and explain data communications system and its components;
- identify different types of network topologies and protocols;
- enumerate the layers of the OSI model and TCP/IP, explain the function(s) of each layer;
- identify different types of network devices and their functions within a network;
- understand and building the skills of sub-netting and routing mechanisms; and
- familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Contents

Unit I: 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 II: 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 III: 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 IV: 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 V: 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 VI: Transport Layer 3 hours

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

Unit VII: Application Layer**3 hours**

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

Unit VIII: 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 IX: 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

References

1. Forouzan, B. A. *Data Communication and Networking*. New Delhi: McGraw Hill Education.
2. Tanenbaum, A. S. *Computer Networks*. New Delhi: Prentice Hall of India.
3. Jenkins, N., & Schatt, S. *Understanding Local Area Networks*. New Delhi: Prentice Hall of India.
4. Stalling, W. *Data and Computer Communication*, New Jersey: Macmillan Press.
5. Kurose & Ross. *Computer Networking: A top down approach*. New Jersey: Pearson Education.

FIN 133 Fundamentals of Financial Management
BCIS, 5th Semester

Course Objectives

The aim of this course is to impart the fundamental knowledge of financial management to the students and enhance their analytical knowledge and skills in financial management of related industry through industry specific cases.

Course Description

This course is designed focusing the students who study only one semester course of financial management, and therefore it covers only the fundamental aspects of financial management. This course introduces financial concepts and principles, and explains how they apply to specific operations in non-financial service sectors such as hospitals, hotels, IT and travel businesses. This course covers introduction to financial management environment, financial statements and analysis of service industry, risk and return, time value of money, raising capital, cost of capital, capital budgeting, capital structure and leverage, dividend policy and working capital management.

Course Outcomes

By the end of this course, students should be able to:

- understand the basics of financial management, forms of organization of non-financial service industry and structure of financial markets and institutions;
- understand and analyze the financial statements of service industry using the key financial ratios;
- raise funds from the financial markets;
- apply the concept of time value of money to work out the value of different types of cash flows;
- calculate the component and composite cost of capital;
- apply the different techniques of capital budgeting to select the projects;
- understand basic aspects of capital structure and leverage; and
- explain dividend decision policies; and
- discuss the concepts and components working capital, and calculate the working capital cash flow cycle.

Course Contents

Unit I: Financial Management and Its Environment

6 hours

Nature of financial management; Finance functions; Role of the financial manager; financial goals; Forms of organizations; and an overview of financial institutions and markets.

Unit II: Financial Statements 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 measures, Asset management measures, 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 capital; Term loan; Bonds: meaning, types, Bond innovation; Preferred stock; Common stock: equity account in balance sheet, Rights 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 capital; and concept of lease financing.

Unit V: Cost of Capital

4 hours

Concept of cost of capital; Component cost of capital: Debt, Preferred stock, Common stock, Retained earnings; Weighted average cost of capital, Application of cost of capital 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 of 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 hours

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

Unit IX: Working Capital Management

5 hours

Concepts and components of working capital; Importance of working capital management; Types of working; Factors affecting working capital; and working capital flow cycle.

Basic Texts

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

References

1. Gapenski, L. C. *Healthcare finance: an introduction to accounting and financial management*. Chicago: Health Administration Press.
2. Andrew, W. *Financial management for hospitality industry*. USA: American Hotel and Lodging Association (AHLA).
3. Iyengar, A. *Hotel finance*. New Delhi: Oxford University Press.
4. Brigham, E. F., & Houston, J. F. *Fundamentals of financial management*. Singapore: Thomson South-Western.
5. Pradhan, R. S. et al. *Fundamentals of financial management*. Kathmandu: Buddha Education Publishers.
6. Manandhar, K. D. et al. *Fundamentals of financial management*. Kathmandu: Khanal Publication.
7. Paudel, R. B., Baral, K. J., Gautam, R. R., & Rana, S. B. *Financial management*. Kathmandu: Asmita Books Publishers and Distributors.

**MKT 241 Principles of Marketing
(BBA: 4th Semester)**

Course Objectives

This is the foundation course on marketing. It aims to build students' understanding of the marketing process and principles. Through this course, students also acquire skills to design marketing strategies of SMEs.

Course Description

This course focuses on operation of the marketing function in a dynamic and competitive environment. It deals comprehensively on issues of emerging marketing practices and challenges, the dynamics of the marketplace, and designing of marketing mix. The course includes topics that help students to understand marketing process and environment, information systems and buyer behavior, segmentation, targeting, and positioning strategies, and strategies related to marketing mix variables.

Course Outcomes

By the end of this course, students should be able to:

- describe the tasks of marketing management in the modern organizations;
- understand the development of the marketing philosophies and their relevance in the contemporary business world;
- identify the challenges faced by marketers in the 21st century;
- identify the micro and macro environmental forces that determine the success of marketing efforts;
- examine the role of marketing information system in designing marketing strategies;
- understand the buying process and influencing factors related to individual consumer and organizations;
- design basic strategies related to market segmentation, targeting, and product positioning;
- analyze the strategies related to marketing mix variables.

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; Advertising 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

1. Kotler, Philip, Gary Armstrong, Prafulla Agnihotri and Ehsan ul Haque. Principles of Marketing: South Asian Perspective. New Delhi: Prentice Hall of India.
2. Baines, Paul, Chris Fill and Kelly Page. Essentials of Marketing. New Delhi: Oxford University Press.

References

1. Koirala, K.D. Principles of Marketing: Kathmandu: Buddha Academic Publications.
2. Kamarulzaman, Yusniza and Nor Khalidah Abu.

CMP 363 Advanced Programming (JAVA)

BCIS, 5th Semester

Course Objectives

This course aims to develop students with knowledge of advanced features of java for making familiar with desktop and web based application. Basic knowledge of programming in Java is expected from students. This course should be associated with laboratory experiments to augment the concepts taught in the class.

Course Description

Introducing the AWT, Using AWT controls, Layout Managers, and Menus, Event handling, Introducing Swing, Exploring Swing ,The Applet Class, JDBC, Introduction to J2EE, Servlet Programming, JSP Programming.

Course Outcomes

On successful completion of this course, students will be able to:

- develop a complete GUI (Graphic User Interface) based system;
- develop web based applications;
- orient themselves towards android based programming;
- develop, compile, and execute java programs using arrays and recursion;
- develop, compile, and execute java programs manipulating strings and text documents;
- develop, compile, execute java programs that include GUIs and event driven programming; and
- demonstrate a final project using applets for inclusion in web pages; applets to access enterprise data bases in robust.

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 Fundamentals

- Adding and removing controls
- Responding to controls
 - Labels, buttons, checkboxes, Checkbox Group choice, lists, scroll bars, text field, text area,
- Understanding Layout managers
 - Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bad Layout
- Menus Bars and Menus, Dialog boxes, File Dialog boxes

Unit III: Event handling

6 hours

- Two event handling mechanisms
- The delegation event model
 - Events
 - Event sources
 - Event listeners
 - Event classes
 - Action Event class, Adjustment Event class, Container Event class, Focus Event class, Item Event class, Mouse Event class, Key Event class, Text Event class, Window Event class
- Sources of Events
- Event Listener Interfaces
 - Action Listener, Adjustment Listener, Container Listener, Focus Listener, Item Listener, Mouse Listener, Window Listener, Key Listener, Text Listener
- Using Delegation event model
- Handling mouse events
- Handling keyboard events
- Handling Action Event 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

- J Label and Image Icon, J Text Field, J Buttons, J Toggle Button, checkboxes, radio buttons, J Tabbed Pane, J List, J Combo Box, J Table
- Two types of 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 hours

- Database Basics
- Structured Query Language
 - Creating a Table
 - Inserting Data
 - Updating records in table
 - Retrieving records from table
 - Deleting records
- Database Drivers
 - JDBC-ODBC bridge
 - Partly Java Partly Native Driver
 - Intermediate Database Access Driver Server
- JDBC API
 - Creating a table
 - Inserting Data in table
 - Reading Data
 - Deleting Data
 - Prepared Statement

Unit VIII: Introduction to J2EE

3 hours

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

Unit IX: Servlet Programming

7 hours

- HTTP
 - GET Request
 - POST Request
- Server Side of the Web Application
- Web Container
 - Structure of a web application
- Servlet Technology
 - Servlet
- Deployment Descriptor
- Steps 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 hours

- JSP Basics
 - JSP Directives
 - JSP Declarations
- 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