Department of Computer Science
University of Peshawar

UNDERGTRADUATE CURRICULUM

BCS

Code: BCS241 Credit Hours: 3

Databases-II

Database Administration

a) Introduction, Layers of Database Administration, DBA Functions and Responsibilities

Database Integrity

a) Introduction
b) Integrity Rules
    1. Entity Integrity
    2. referential
        a) Insertion Rule
        b) Deletion Rule (Restrict, Nullity, Cascade)
        c) Range of values, Not Null, Selection Based Entry(Radio Button, Check Boxes LOV)

Database Security

a) Introduction
b) Physical Security, (Locks, Logbooks, Staff, Categorization)
c) Database Security
    1. View, authorization, Table Subject, Object, Privileges, User defined Procedures
    2. encryption

Database Recovery

a) Introduction, Reasons of Database Failures, Database Recovery Facilities
    1. Backup Logs (Transaction Log, Database Change Log)
b) Database Recovery Methods (Restore, Roll Forward, Roll Backward)
c) Transaction processing

Database Concurrency

a) Introduction, the problem of Lost Updation
b) Concurrency Control Methods (Optimistic Approach, Pessimistic Approach)
c) Managing the Deadlock, Transaction Integrity

Distributed Databases

a) Introduction, Types of Distributed Databases
b) Advantages and Disadvantages of Distributed Database

Object Oriented Databases

a) Introduction to Object Oriented Paradigm
b) Differences in Object Model and Design
c) Object oriented Analysis and Design
d) Cost and benefits of Object data bases

Books:

1. *C.J. Date, An introduction to Database, 6th Edition, Addison Wesley Company, 1983.*
2. *Jeffrey A Hoffer, Database Management, 4th edition, The Benjamin/Cummings Publishing Company Inc, 1994.*

3. *Thomas M. Connolly, Carolyn E. Begg, Database Systems: A Practical Approach To Design, Implementation And Management, 4th Edition, Addison Wesley Publishing Company, 2004.*
4. *Tools: Any SQL based DBMS.*

Code: BCS242 Credit Hours: 4

Programming Language-II(Visual C++)

Templates

a) Function and Class Templates, Overloading Templates, Overridding Templates
b) Templates and Inheritance, Templates and Friend Functions

Exception Handling

Basic Bug Traps, C++ Exception Handling and Resumption

Basic GUI Programming

1. Documents and Views, Status Bars and Tool Bars, Dialog Boxes, Controls, Property Pages and Sheets, Drawing Functions, Menus
2. Bitmaps and Bit Operations, Printing and Previewing

ActiveX Applications and Controls

Developing ActiveX Controls and Applications

Socket Programming

Communication Among Processes

Process Synchronization, Exchange Data through Pipes and Shared Memory, Clipboards, Using OLE

Advance Programming Techniques

Database Access, SQL, Multithreading, MFC Library

Debugging

Understanding Debugging, Basic Debugging Operations

Books:

1. *Ivor Horton, Beginning Visual C++6, New Edition, Wrox. Publications, 1998.*
2. *Michael J.Young, Mastering Visual C++6, Sybex Inc, 1998.*

Code: BCS243 Credit Hours: 4

Operating Systems

Introduction

a) Definitions
b) Evolution
c) Structure and Functions

Process Management

a) Processes, Process States, Process State Models
b) Process Synchronization and Inter-Process Communication. Classical IPC Problems
c) Process Scheduling
d) Process Management in Windows NT and UNIX

Memory Management

a) Real Memory Organization and Management
b) Virtual Memory Organization: Paging, Segmentation, Combined Paging and Segmentation
c) Virtual Memory Management: Placement, Replacement, and Fetch Strategies. Working Set Theory, Virtual Memory Management with Working Sets.

File Systems
a) Files
b) Directory Systems
c) File System Implementation
d) Security
e) Protection Mechanisms

Input/Output Management
a) Principles of 1/O Hardware
b) Principles of 1/O Software
c) Disks
d) Clocks
e) Terminals

Deadlock
a) Resources
b) Deadlock

c) Deadlock Detection
d) Deadlock recovery
e) Deadlock Avoidance
f) Deadlock Prevention
g) Other issues

An overview of major Operating Systems
a) Unix
b) NT
c) Windows

Distributed Operating Systems
a) Network Operating Systems
b) Distributed Operating System

Case Studies
a) Unix
b) NT
c) Windows

Books:

1. *Deitel, H.M, An Introduction to Operating System, 2nd Edition, Addison Wesley Publishing Company, 1983.*
2. *Collin Ritchie, Operating Systems, 2nd Edition, BPB Publications, 1998.*
3. *Tenenbaum, Modern Operating Systems, 2nd Edition, Prentice Hall, 1998.*

Code: BCS244 Credit Hours:3

Computer Organization and Assembly Language Programming

Computer Organization
Data and Instruction Representation.

Assembly Language Programming

a) ASCII Code Assembler Directives vs Machine Instructions.
b) Keyboard Input and Screen Output.
c) Addressing & Instruction Formats/types
   i. Op-code encoding.
   ii. Addressing modes.
   iii. Addressing types.

d) Detailed study of different/Instruction types-I
   i Data-transfer instructions.
   ii Data transfer instructions.
   iii Arithmetic instructions.
   iv Logical instructions, program control instructions.
e) Conversion between ASCII Strings and Binary Numbers
f) Stack Operations
g) Debugging
h) Interrupts
i) Macros
j) Video Output
k) Disk 1/O

Books:

Kip R. Irvine, Assembly Language for IBM PC, 2nd Edition, Macmillan Publishing Company, 1993.

Code: BCS245 Credit Hours: 4

Data Communications and Networking

Data transmission & Networking Concept

a) Introduction to data communication, advantages of digital communication, A communication Model.
b) Codes for digital signal transmission
c) Parallel and serial transmission
d) Synchronous and Asynchronous Transmission
e) Baseband and Broadband Transmission
f) Simplex, Half-duplex and Full-duplex transmission
g) Modems, types of Modems, properties of modems
h) Topologies: Bus,Star,Ring,Tree,Mesh.
i) Need of Networks, Peer- to-Peer networks, Client- Server networks, Hybrid networks
j) Circuit Switching, Message Switching and Packet Switching

Transmission Impairments

a) Attenuation
b) Delay Distortion
c) Noise
d) Channel Capacity

Transmission Media

a) Guided Transmission Media, Twisted Pair, Coaxial Cable and Optical Fiber.
b) Wireless Transmission- Terrestrial & Satellite Microwave and Broadcast Radio

Data Encoding

a) Digital and Analog transmission.

b) Digital Data & Digital Signals
c) Digital Data & Analog Signals
d) Analog Data & Digital Signals
e) Analog data & Analog Signals

Data Communication Interface

a) Line Configuration, Interfacing, Null Modem
b) Point to point and multipoint link

Data Link Control

Flow Control Techniques:

a) Polling Selection, Request to send/clear
b) XON/XOFF
c) Stop & Wait
d) Sliding Window

Error Detection/correction & Control Techniques

Error Detection and Correction Techniques:

1. Parity bit method
2. Vertical and horizontal redundancy checking
3. Cyclic redundancy checking(CRC).

Error Control Techniques:

1. Stop and Wait ARQ
2. Go-Back-N ARQ
3. Selective-Reject ARQ
4. High Level Data Link Control Protocols (HDLC)

Multiplexing

a) Frequency Division Multiplexing
b) Synchronous and Statistical Time Division Multiplexing

Internetworking Devices

a) Hubs
b) Switches
c) Routers
d) NICs

Network Models

a) TCP/IP Model
b) OSI Model

LAN Architectures

a) Ethernet, Token Ring, FDDI, Token Bus, ARCNet, AppleTalk.

Books:

1. *William Stallings, Data and Computer Communications, 7th Edition, Prentice Hall, 2003.*
2. *Behrouz A.Forouzan, Data Communications and Networking, 3rd Edition, McGraw Hill, 2003.*
3. *Andrew S. Tenanbaum, Computer Networks, 4th Edition, Prentice Hall, 2002.*
4. *Dr. D.C.Agarwal, Computer Communication and ISDN systems, 1st Edition, Khanna Publishers, 1989.*