Department of Computer Science
University of Peshawar

UNDERGTRADUATE CURRICULUM

BCS

Code: BCS231 Credit Hours: 3

Digital Logic Design

Numbering Systems

a) Number Representation, Conversion, and Arithmetic in/between Binary, Octal, Decimal, Hexadecimal Numbering Systems
b) Complements and Complement Arithmetic, Binary Coding Schemes, Binary Logic, ICs

Boolean Algebra and Logic Gates

a) Definitions, Theorems and Properties, Boolean Algebra theorem Proving, Duality Principle
b) Boolean Functions, Standard and Canonical Forms of Boolean, Functions, Conversion between standard and canonical forms, Logic Gates, Implementation of Boolean Functions with AND, OR, and Not Gates.

Simplification of Boolean Functions

Simplification by Algebraic Manipulation, Map and Tabulation Methods, Boolean Function Implementation with NAND and NOR Gates.

Combinational Logic

a) Design and Analysis Procedures for Combinational Circuits, Designing and Analyzing Adders, Subtractions, and Code Converters.
b) EOR and ENOR Functions, their Applications and Implementations

Combinational Logic with MSI and LSI

a) Binary Parallel Adder, Decimal Adder, BCD Adder, Magnitude Comparator, Decoders, Demultiplexors, Encoders, Multiplexers, ROMs, PLAs
b) Implementation of Boolean Function with Decoders, Multiplexers, ROMs, and PLAs.

Sequential Logic

a) Introduction, Latches, Flip Flops, Types of Flip-Flops, Synchronous and Asynchronous Flip-Flops, Master-Slave and Edge-Triggered Flip-Flops.
b) Design and Analysis Procedures for Sequential Circuits, Designing and analyzing Counters and Other Sequential Circuits, State Machines.

Registers, Counters, and Memory Unit

Registers, Counters, Timing Sequence and Memory Unit.

Asynchronous Sequential Logic

a) Analysis Procedure, Circuits with Latches, Design procedure
b) Reduction of State and Flow Tables, Race Free State Assignment

Digital Integrated Circuits

a) Bipolar Transistor Characteristics, RTL and DTL Circuits
b) Transistor-Transistor Logic, Emitter-Coupled Logic(ECL)
c) Metal Oxide Semiconductor (MOS), CMOS

Books:

Morris Mano, Digital Logic and Computer Design, Prentice Hall, 1992.

Code: BCS232 Credit Hours: 4

Database-I

Database Foundation

a) Introduction, Data and Information, Components, Advantages
b) Data Association, Entities, Keys and its Types, Attributes
c) Data Associations, Data Structure Diagram

E-R Model

a) Basic Constructs (Symbols), Degree of Relationships, Cardinality, Gerund
b) Modelling time dependent Data Super Types, sub Types

Data Models

a) Hierarchical, Network, Relational Comparison of all Data Models
b) Relation, Characteristics of Relation, Converting E-R Model into Relations.

Normalization (1NF, 2NF, 3NF, 4NF, 5NF)

Relational Algebra, Relational Calculus

Database Design (Conceptual Design, Physical Design)

SQL

a) Introduction: Creating, Altering, and Deleting table
b) Inserting, Updating, and Deleting Rows, Querying Tables
c) SQL Functions.
    1. Arithmetic: Group (AVG, COUNT, MAX, MIN,SUM)
    2. DATE, Special Functions (IN, BETWEEN, LIKE, NULL)
d. Managing Multiple Tables

Books:

1. *Jeffery A. Hoffer, Modern Database Management, 4th Edition, The Benjamin/Cummings Publishing Company Inc, 1994.*
2. *Oracle Developer/2000 Forms 4.5, 2nd Edition. SAMS Publishing, 1997.*

Code: BCS233 Credit Hours: 3

Data Structures

Introduction

Linear Structures: Arrays

a) Linked implementation
b) Odd shaped Arrays
c) Right Triangular
d) Isosceles triangular

Notations and their conversion (using stack)

Stacks & Queues

a) Stacks
b) Queues
c) Basic Operations

Lists

a) Linked Lists
b) Types of Linked Lists

Trees
a) Linked implementation
b) Binary Trees
c) B-Trees

Trees Traversal
a) Basic Operations
b) Traversals Sets

Graphs
a) Representation of directed and undirected graphs
b) Traversals
c) Minimum cost spanning tree

Files
a) File organizations: Sequential
b) Indexed Sequential
c) Direct (Hashing)
d) Inverted
e) Use of B-Tree Indexes
f) Merging files

Sorting & Searching
a) Internal Sorting
   1. Selection
   2. Insertion
   3. Quick, Using recursion & stack
   4. Tree
   5. Heap
b) External Sorting
   1. Balanced Merged Sort
   2. Poly-phase Merged Sort
c) Searching
   1. Binary Search
   2. Sequential Search for ordered and unordered list

Books:
1. *Jean-Paul Tremblay, Paul G. Sorenson, An Introduction to Data Structures with Applications, McGraw Hill Inc, 1984.*
2. *Aaron M. Tenebaum, Data Structures, 2nd Edition, Prentice Hall, 1995.*

Code: BCS234 Credit Hours: 3

Business Communications

An Overview of Communication
a) Defining communication, importance of communication concepts of communications.
b) Barriers of communication, Nonverbal communication, Principles of effective communications.

Business Communication in Context
a) Business communication and the global context.
   1. Background to international communication, and the national cultural variables.
   2. Individual cultural variables.

b) Business communication and ethics Influences on personal ethics, communication and ethical issues.

Business communication and technology

a) Managing information with in organization
   1. History of technological developments.
   2. Challenges to the organization made by the new technologies.

b) E-mail and other technologies for communication
   1. Defining e-mail, using e-mail, understanding how email works.
   2. Understanding the internet, Establishing Security, Voice mail, Group ware.
   3. CD-ROM Database, Teleconference, Faxes.

c) Managing information our sides the organization

Message design

a) Process of preparing effective business messages
   1. Five planning steps, Basic organizational plans, Beginning and ending.
   2. Composing the message.

b) The appearance and the design of business message business letters, memorandums, special timesaving message media

c) Good news and natural messages

d) Organizational plan favorable Replies, neutral messages

Written communication: Major Plans for letters and MEMOS

a) Bad/+

b) 123-News messages
   1. The right attitude, plans for bad news messages.
   2. Negative replies to request, Unfavorable unsolicited messages

c) Persuasive written messages.
   1. Organization of persuasive messages.
   2. Persuasive request persuasive sales letters.

Written communication: Reports

a) Short reports
   1. Suggestions for short reports, information memorandum reports.
   2. Analytical memorandum reports, letter reports.

b) Long formal reports (prefatory and supplement selection, presentation of long reports

c) Proposals (Purpose , kinds, parts, sort proposals, long formal proposals)

d) Writing style and appearance

Strategies for oral communication

a) Strategies for successful speaking and successful listening
   1. Strategies for improving oral presentation, Strategies for reducing stage fright.
   2. Strategies for improving listing skills.

b) Strategies for success informative and persuasive speaking

Books:

Herta A Murphy, Herbert W. hildebrandt, Jane P. Thomas,Effective business communication, 7th edition, McGraw Hill/Irwin, 1997.

Code: BCS235 Credit Hours: 3

Electronics

Direct Current Circuits

a) Joules' Law

b) Circuit Analysis

c) Kirehhoff's Rules

d) Wheatstone Bridge

Alternating Currents

a) Sinusoidal Signals, Frequency, amplitude and phase, uns, value, power factor.
b) Capacitive reactance
c) Inductive reactance
d) RL Filter
e) RC Filter
f) Diffenitiating and integrating factor
g) Transient currents
h) Transition and Diffusion Capacitance
i) Reese Recovery Time
j) Zener Diode
k) Light Emitting Diode.

Diode Applications

a) Load Line Analysis
b) Series/Parallel and Series-Parellel Configurations.
c) AND/OR Gates
d) Half wave and full wave rectifier.
e) Clippers and clampers
f) Voltage multiplier circuits, junction.

Transistor

a) Transistor Construction
b) Transistor Operation
c) Different Configurations
d) Transistor amplifying action
e) Limits of Operations
f) DC Biasing
g) Fixed Bias Circuit
h) Emitter Stabilized bias circuit
i) Voltage Divider biased
j) BJT transistor Modeling
k) BJT small signal analysis

Amplifiers

a) Differential and Common mode operation
b) Op-amp basic
c) Op-amp application

Books:

James J. Brophy, Basic Electronics for Scientists, 5th Edition, McGraw Hill Publishing Company Inc, 1990.