

**Department of Computer Science
University of Peshawar**

UNDERGRADUATE CURRICULUM

BCS

Code: BCS111

Credit Hours: 3

Fundamentals of Computers

Basic of Computer

- a) Introduction and history of Computers.
- b) Types of Computer
- c) Computer Organization

Computer Software

- a) Software Introduction
- b) Types of Software
- c) PC Platform.
- d) Computer Virus.

Data Processing and Storage

- a) Data Processing Techniques
- b) Data Storage (Bit, Byte, RAM, ROM, cache Memory, Secondary Storage (FDD, HDD, Tape, CD)).

The Processor

- a) Bus, Port
- b) Computer Motherboard.
 - 1. Microprocessor
 - 2. Math Co-processor
 - 3. Memory Chip
 - 4. Support Chips
 - 5. Built-in programs
 - 6. Expansion Slots

Input and Output Devices.

- a) Input Devices
 - 1. Keyboard and its types
 - 2. Point and Draw devices
 - 3. Scanner, Digital Camera, Speech recognition system and multimedia
- b) Output Devices
 - 1. Monitor(Graphic Adopter, Size, Resolution and Types of Monitors)
 - 2. Printers and Types (Dot matrix, inkjet and laser)
 - 3. Plotters (Raster and Pen)
 - 4. Presentation Graphics and special function terminals (ATMs POSs)

Windows

- a) Windows Introduction
- b) Finding Files, Installing Printers
- c) The Desktop and types of windows(application, document, dialog)
- d) Elements of an application window
- e) Understanding folders, copying, detecting and moving files

Word Processing (MS Word)

- a) Basic concepts and features

- b) Creating, saving, editing, formatting and printing documents
- c) Working with Tables

Electronic Spreadsheet (MS Excel)

- a) Basic concepts and features
- b) Creating, saving Excel sheet, editing the sheet
- c) Managing formula, formatting the sheet and printing the sheet
- d) Working on workbook

Basics of Internet usage

- a) Introduction
- b) World Wide Web and Web sites
- c) Introduction to Internet based services and use of E-mail.

Books:

1. Sawyer, William, Hutchinson, *Using Information Technology, 2nd Edition, McGraw Hill, 2000.*
2. J. Glenn Brookshear, *Computer Science: An Overview, 8th Edition, Addison-Wesley, 2005.*
3. Timothy J. O'Leary, Linda I. O'Leary, *Computing Essentials, 15th Edition, McGraw-Hill's Primis Custom Publishing, 2004*

Code: BCS112

Credit Hours: 3

Mathematics-1(Calculus-1)

Real and Complex Numbers

- a) Real Numbers
- b) Complex numbers

Functions, Limit and Continuity of a function.

- a) Functions
- b) Graphs
- c) Sequences
- d) Limit and Continuity of a function of one variable

Differentiation-1

- a) Differentiation
- b) Product and Quotient Rules
- c) Tangent
- d) Normal

Differentiation-II

- a) Chain Rule
- b) Implicit differentiation

Application of Differentiation-1

- a) Roll's and Mean Value Theorem
- b) Taylor's Theorem
- c) Maclaurin's Theorem

Application of Differentiation-II

- a) Newton's and Picard's method and its application
- b) Maxima
- c) Minima

Indeterminate forms

- a) L'Hospital's Rule
- b) Application of L'Hospital's Rule

Integration

- a) Basic Integration
- b) Integration by identities
- c) Integration by substitutions
- d) Integration of trigonometric functions
- e) Integration by parts

Application of Integration

- a) Area and Volume by integration
- b) Differential Equations (Separable variables techniques)

Books:

1. Anton Howard, *Calculus, John Wiley & Sons Inc, 1999.*
2. George B.Thomas, Ross L. Finney, Maurice D. Weir, Frank R. Giordano, *CALCULUS, 10th Edition, Addison Wesley Publishing Company, 2002.*

Code: BCS113

Credit Hours: 3

Probability and Statistics

Introduction

- a) Meaning of statistics
- b) Importance of statistics in various fields
- c) Population and Sample
- d) Variables
- e) Statistical data

Statistical Measures of Data

- a) Measures of Central Tendency, Mean, Median, Mode and quartiles
- b) Measures of Variation: Range, Standard Deviation, Variance and Coefficient of Variation.

Sets and Probability

- a) The concept of a Set
- b) Set Operations and Algebra of Sets
- c) Permutations and Combinations
- d) The Concept of Probability
- e) Theorems of Probability
- f) Conditional Probability

Random Variables and Probability Distribution

- a) Concepts of a Random Variable
- b) Discrete Probability Distributions
- c) Continuous Probability Distributions
- d) Joint Distribution of two random variables
- e) Mathematical Expectations

Special Probability Distributions

- a) Binomial Distribution
- b) Poisson Distribution
- c) Hypergeometric Distribution
- d) Uniform Distribution
- e) Normal distribution

Sampling Theory

- a) Sampling Distribution
- b) Sampling Distribution of the Mean
- c) Sampling Distribution of the differences of means
- d) Sampling Distribution of Proportions
- e) Sampling Distribution of the Difference of Proportions

Statistical Inference

- a) Point estimation
- b) Properties of a good estimator
- c) Confidence Intervals
- d) Statistical Hypothesis
- e) Testing a Statistical Hypotheses Tests Concerning Means
- f) Tests Concerning Means
- g) Tests Concerning Difference between two Means
- h) Goodness of Fit Test and Test for Independence

Simple Linear Regression and Correlation

- a) Simple Linear Regression
- b) Least Squares estimation of the Regression Parameters
- c) Inference concerning the Regression Coefficients
- d) Linear Correlation
- e) The coefficient of correlation
- f) Properties of the coefficient of correlation

Books:

1. *Ronald E. Walpole, Introduction to Statistics, Latest edition, Macmillan Publishing Co. Inc. New York, 1999.*
2. *I. Miller and J.E Freund, Probability and Statistics for Engineers, 4th Edition, Prentice Hall, 1990.*

Code: BCS114

Credit Hours:3

Functional English

Function Asking and answering questions

- a) Structure The Present perfect
- b) Reading Guessing the meanings of words
- c) Writing Informal letters: beginning and ending
- d) Listening Understanding directions

Function Seeking Agreement and Confirmation

- a) Structure The Present Perfect and simple past tense
- b) Reading Guessing the meanings of words
- c) Writing Joining Sentences
- d) Listening Listening to a narrative account

Function Agreeing and Disagreeing

- a) Structure Reported Speech
- b) Reading Predicting
- c) Writing Informal letters
- d) Listening Giving advice

Function **Possibility/Impossibility**

- a) Structure Conditionals
- b) Reading Skimming and Scanning
- c) Writing Formal letters
- d) Listening Listening to talk/lecture

Function **Certainty/Uncertainty: obligations**

- a) Structure The Passive
- b) Reading Function in a text
- c) Writing Formal letters
- d) Listening Listening to an interview

Function **Preferences/Interactions**

- a) Structure The ing form
- b) Reading Reading the main idea and supporting details in text
- c) Writing Formal letters
- d) Listening Listening to a talk/lecture

Function **Permission**

- a) Structure The Past Perfect and future perfect tense
- b) Reading Classification
- c) Writing Applying for a job
- d) Listening Listening to a radio broadcast

Function **Appreciation, regret and indifference**

- a) Structure Relative Clauses
- b) Reading Thematization
- c) Writing Note Taking
- d) Listening to an argument

Function **Suggesting/Warning**

- a) Structure Relative Clauses
- b) Reading Facts and Opinion
- c) Writing Summarizing
- d) Listening Listening to a story.

Books:

CA Exams Study Text: Modular Foundation Examination Module-A Paper A1 Functional English, 3rd Edition, Professional Business Publications, Lahore, Pakistan, 2000.

Code: BCS115

Credit Hours: 4

Programming Concepts

Introduction to Computer Program

- a) Computer program concepts, High level languages, 4 GL
- b) Editor, Compiler, Source Program, Object Program

Computer Program Engineering

- a) Introduction, problem solving techniques, qualities of a good program
- b) Program life cycle

Computer Program Basics

- a) Basic program structure, (Input, Output, process)
- b) Constant, Variable, data types, operators, expression, statement

I/O and Debugging

Input/Output statements, debugging procedures, errors logical, syntax

Transfer of control structures

- a) Conditional/Conditional
- b) Simple decision (if-then-else)
- c) Complex decision(case structure/nested decision)

Repetition

For structure, while structure, repeat structure Recursion

Arrays

Arrays (introduction, single, multidimensional)

Functions and Subprograms, Recursion

Storage Classes

Memory Management Model

String Handling

Character testing and Data Conversion

Far pointer and VDU (Video Display Unit)

Bit wise operators

Union

Preprocessor. Commands

Files (All access modes,) character I/O on file, line oriented I/O on file, file

Management, Non-Text file I/O

Command Line Arguments (hard coding vs flexible coding)

Calling interrupt

Re-direction Request

Books:

1. *Robert Lafore, C programming Using Turbo C++, SAMS Publishing, 1997.*
2. *Mian Altafullah, C Theory & Practice.*
3. *Deitel & Deitel, C How to Program, 3rd Edition, Prentice Hall, 2000.*