

**Tilak Maharashtra University**  
**Bachelor of Computer Applications**  
**Syllabus 2017-18(CBCS)**

**First Year**

**BCA-141 - Computer Fundamentals**

**UNIT-1**

- Input Unit
- Output Unit
- Storage Unit
- Arithmetic Logic Unit
- Control Unit
- Central Processing Unit
- System Concept
- Memory Management

**UNIT-2**

- Non-positional Number System
- Positional Number System
- Binary Number System
- Octal Number System
- Hexadecimal Number System
- Converting from one number system to another
- Converting from another base to decimal
- Converting from decimal to another base
- Converting from a base other than 10 to another base other than 10
- Shortcut Methods for binary to octal conversion
- Shortcut method for Octal to binary
- Shortcut Method for Binary to hexadecimal
- Shortcut Method for hexadecimal to Binary
- Conversion examples

**UNIT-3**

- Boolean algebra
- Logic Gates
- AND,OR,NOT,NAND,NOR Gate
- Logic circuits
- Converting expression to logic circuit
- Universal NAND gate
- Universal NOR gate
- Exclusive OR and equivalence function
- Design of combinational circuit
- Design of Half- adder
- Design of Full- Adder

**UNIT-4**

- Planning the computer programme
- Algorithm
- Flowcharts
- Symbols, Rules, Levels, Sample
- Advantages and limitations of Flow Charts
- Pseudo code
- Examples of Pseudo code and Algorithms

**UNIT-5**

- Process Management
- Multi-programming
- Multi-Tasking
- Multi-Threading

- Multi-Processing
- Time Sharing
- Memory Management
- File Management

## **UNIT-6**

- Some popular operating Systems
- UNIX
- MS-DOS
- Windows XP
- Windows Vista
- Linux

## **Reference Books**

Computer fundamentals - P.K. Sinha  
 Computer fundamentals - D.P. Nagpal  
 Computer fundamentals - B.Ram  
 Fundamental of computer- V. Rajaraman.B.Ram  
 Fundamental of computer- V. Rajaraman.

## **BCA-142 - Mathematics and Statistics**

### **SET THEORY**

Set concept, Subset, Union and Intersection, Complement of a Set, Universal set and De Morgan's Law

### **INTRODUCTION TO STATISTICS**

Importance of statistics, scope of statistics in industry Economics, social sciences, management's sciences

### **STATISTICAL DATA**

Types, variable, raw data attributes primary and secondary data, Graphical representation of data, histogram, frequency, polygon, Ogive curves, and diagrammatic representation of data. Simple bar diagram, subdivided bar diagram, pie diagram.

### **FUNCTION**

Number System, Preliminary Concepts, Types of Functions and

### **Relations SEQUENCES, SERIES AND PROGRESSION**

Arithmetic progression, geometric progression, numeric progression, means numerical problems, Arithmetic, geometric, finite and infinite series

### **PERMUTATIONS AND COMBINATIONS**

Fundamental principles, permutations, combinations, Simple Relations, numerical problems

### **LINEAR EQUATIONS**

Determinants, Matrices, Types of matrices

Linear Homogeneous and Linear non-homogeneous

### **equations MEASURES OF CENTRAL TENDENCY**

Concepts of central tendency of data, arithmetic mean, median, mode, Effects of change of origin scale on mean, numerical problems.

### **QUADRATIC EQUATIONS**

Formation of equations, Roles nature of roots of quadratic, equation, complex, numbers

### **PROBABILITY**

Theorems, Probability, Conditional Probability, Events and Probability

### **Model BINARY SYSTEMS**

Binary digits, bit, byte, Binary Operations, Boolean relations Diagrams interrelation with Boolean, matrix and Diagrams

### **MEASURES OF DISPERSION**

Measures of dispersion absolute and relative measure of dispersion, Range, mean, variance, standard deviation coefficient of variation. Numerical problems.

### **CORRELATION**

### **INDEX NUMBERS**

### **MATHEMATICAL LOGIC**

## Reference Books:

Mathematics and Statistics:	M. L. Vaidya, M. K. Kelkar
Statistical Analysis:	A Computer Oriented Approach
Introduction to Mathematical Statistics	
Introduction to calculus of finite differences:	Richardson C.

## Note:

- ✓ Following points has been **truncated** from the respective chapters:

### ➤ Mathematics:

- ❖ Chapter 2 : Functions
  - 2.6 Inverse of a function
- ❖ Chapter 3 : Sequences, Progressions and Series
  - 3.5 Harmonic progression (H.P)
  - 3.7 Series
    - 3.7.1 Standard Series
    - 3.7.2 Infinite Geometric Series
- ❖ Chapter 7 : Probability
  - 7.4 Conditional Probability
  - 7.5 Independent events
  - 7.6 probability Model

### ➤ Statistics:

- ❖ Chapter 5: Measures of Skewness
- ❖ Chapter 7: Bivariate Data

**Has been truncated from the syllabus of Statistics**

- ✓ Whole Chapter of Binary System has been modified with new contents.

Chapter 8 : Binary systems

Conversions: Decimals to Binary, Binary to decimals and octal.

- ✓ **One new Chapter has been added to syllabus which is as follows :**
  - ❖ Chapter 9 : Logic Truth Tables-AND, OR, NOT

## BCA-143 - Basic English

### SECTION – I

#### 1. Grammar

Use of Articles and Prepositions

Tense

Transformation of Sentences

Parts of Speech

Idioms and Phrases

Vocabulary

- Synonyms
- Antonyms
- One Word Substitution
- Homophones & Homonyms

Punctuations

Common Errors

Spelling in English

### SECTION – II

#### 2. Composition

Formal & Informal

Writing Precise

Essay Writing

Report Writing

Reading Comprehension

**Reference Books:**

High School English Grammar and Composition – P.C.Wren, H.Martin, N.D.V.Prasada Rao  
Longman Grammar of spoken and written English – Douglas Biber, Stig Johansson, Geoffrey Leech, Susan Conrad, Edward Finegan  
Speaking English Effectively- Mohan Krishna and Singh N.  
A handbook of Business Letter – Prailly L.E  
Organised Writing Book – Sarwati V.  
Wiw-nriol.com

**OR**

**BCA-144 Japanese**

**OR**

**BCA-148 Sanskrit**

**BCA 145C Programming**

**1. LOGIC DEVELOPMENT:**

Variable & Constants, Operators, Programming Constructs, Sequence, Selection Iteration.

**2. INTRODUCTION TO FLOWCHARTING:**

What Are Flowcharts? Types of Flowcharts, Advantages of Flowcharts, Flowchart Symbols, Use of Symbols, Developing Flowcharts, Flowchart Aesthetics.

**3. TECHNIQUES:**

Flowchart For Computations, Flowcharts For Decision Making, Flowcharts For Loops Predefined Process, Arrays.

**4. INTRODUCTION TO C**

**DATA TYPES AND OPERATORS:**

Instruction in C, Operators, Type Conversions, Operator precedence in C, Data Types Revisited

**INPUT / OUTPUT:**

Introduction, Unformatted I/O Functions, Formatted I/O Functions.

**5. CONTROL STATEMENTS:**

Decision Control Instruction, Loop control or Iteration instructions, Case Control Instructions, Jump Statements.

**6. ARRAYS AND STRINGS:**

Introduction, One Dimensional Array, Two Dimensional Arrays, Strings, String Library Functions, Two Dimensional Arrays of Characters.

**7. FUNCTIONS:**

What is a Function? , Why use Functions? Passing Value between Functions, Scope Rule of Functions, Advanced features of Functions.

**8. POINTERS:**

Pointers Overview, Pointers and Functions, Pointers and Arrays, Dynamic Memory Allocation, Pointers to Pointers.

**9. STRUCTURES**

Introduction, Declaring a Structure and Union, Array of Structure, Assigning a Structure variable to another variable, Nesting of Structure, Passing a Structure variable to a Function, Pointers and Structures, User defined Data Types.

#### **10. FILE MANIPULATION:**

Introduction, Unformatted High level Disk Input Output functions, Character Input output in Files, Command Line Arguments, String Input Output in Files, Formatted High level Disk I/O Functions, Direct Input Output, Error Handling functions, File Positioning, Introduction to Preprocessor, Macro substitution, File Inclusion.

#### **Reference Books:**

The spirit of C	- Mulish Cooper
Programming in ANSI C -	- Bal guru swami
Let us C-	- Yashwant Kanitkar
Data Structure Using C	- Tenenbaum

## **BCA-146- Network Fundamentals**

### **1. Basics of Computer Network**

Define computer network, identifying basic networking elements and describing roles of Clients, Server, Peers, and Transmission Media & Protocols Network Services: File, print, Message, Database Application Identifying Differences bet. Centralized & distributed network architecture Identifying appropriate transmission media to meet a business need .Cable Media & Wireless Media, Network Connectivity devices, Modern repeaters, Hubs Bridges, Multiplexes and routers

### **2. OSI Layers**

Identifying 7 Layers of OSI

Physical Layer: Connection types used in Computer Network, Common Physical technologies used in computer

Network: BUS, Ring, Star, Cellular, Analog & Digital Signals, bandwidth

Data link Layer: Purpose of data link Layer, Switching Methods, Routing, Network layer connection services, Bridging

Transport Layer: Purpose of transport layer, Address name resolution, Flow control, Error control

Session Layer: Purpose of Session Layer, Session Administration, Dialog control methods Presentation

Layer: Purpose of Presentation Layer, Application Layer: Purpose of Application Layer

### **3. TCP/IP Fundamentals**

Identifying Network Classes, obtain register IP address, Domains, how Host name, host table and DNS work. Windows Internet naming services (WINS), Subnets, Subnets mask Assigning and managing IP subnets.

### **4. Network Operating System**

Introduction to Windows XP /Vista and Windows 7 as desktop operating systems and Sharing files and folders in Windows Network, Printing in Windows Network.

Introduction to Windows 2003 and windows 2008 as Network operating system ,Working with NDS Basics, Creating Users and Login scripts

#### **Reference Books**

Computer Networks	Tanenbum
Local area Networks	Keiser / D. Come

## **BCA-147 – Practical – C Programming**

### **Semester-II**

## **BCA-241 –Communication Skills**

### **1. The Types of Business Communication**

Introduction

Business Communication

The Classification, Functions & Scope of Business Communication

Internal Communication

External Communication

Conclusion

## **2. The Communication Process**

Elements of Communication

The Communication Cycle

The Barriers To Communication

## **3. The Principles of Communication**

Introduction

The Medium of Communication

Accuracy

Brevity

Clarity

Courtesy

Conclusion

## **4. The Modes of Communication**

Introduction

The Types of Communication

Oral Communication Written

Communication Non-Verbal

Communication

Visual Signs in Non-Verbal

Communication Audio Signals in Non-Verbal Communication Silence

Time

Touch

The Functions of Non-Verbal Communication

The Merits & Demerits of Non-Verbal

Communication Conclusion

## **5. Verbal Skills**

Introduction

The Language used in Oral Communication

Verbal & Linguistic Modifiers & Regulators & Voice

Culture The Techniques of Delivery

Conclusion

## **6. The Art of Listening**

Listening & Hearing

The Value of Listening

The Functions of Listening

The Pitfalls involved in Listening

The Process of Listening / The Principles of

Listening How to Listen Efficiently

The Barriers to Efficient

Listening The Types of

Listening Conclusion

## **7. Body Language**

Introduction

The Types of Body Language

Facial Expressions

Kinesics Related To The Body

Touch

Conclusion

## **8. How to conduct Oral Communication**

The Classification of Oral

Communication Dyadic Communication

Group Communication

Requests

Complaints

Inquiries

Introduction

Dictation

The Telephone

Interviews An Overview

At the Interview Venue

## **9. The Essentials of Written Communication**

Introduction

Alignment

Font Style

Bold, Italics & Normal

Font Size

Indentation & Block Style

Items

Emphasis

Letter Heads

Continuation Sheets

Stationery Presentation Conclusion

## **Reference Books:**

1. Communication Skills : Dr. Rao & Dr. Das- Himalaya Publishing House
2. Communication Skills : Dr. Urmila Rai, S.M. Rai – Himalaya Publishing house
3. Communication : By C.S. Rayadu - Himalaya Publishing House
4. Developing Communication Skills : Mohan Banerjee, Macmillan, India
5. Business Correspondance & report : R. C. Sharma, Krishna Mohan Writing- A Practical approach to Business & technical communication
6. Communication Skills for : Dr. Anjali Ghanekar, Everest Publishing

## **BCA-242 Advanced Web Designing (HTML, JavaScript, ASP)**

### **1. HTML Basics**

Definition of HTML, Markup language, hypertext etc, html tags-tag syntax. Structure of html document- head section and body section. Block level elements Text level elements, Font tag, base font tag, big and small tags, bold italic and underline tags, the strike, teletype and BR tag, subscript and superscript tags, the quote tag.Heading tag and attributes, paragraph tag, center and block quote tags, hr tag the preformatted tag lists-ordered and unordered lists, definition lists.

### **2. Images and colors-**

background images and colors and their attributes.

### **3. Hyperlinks & Table**

Anchor tag, h ref, title attribute, Table element, TR, TD, TH tags, caption elements, attributes of the table tag.

### **4. Frames & Forms**

Creating frames-vertical, horizontal and grid of frames, attributes of the frameset element, frame tag and its attributes, linking frames.

The form tag-attributes- action, method the input elements and its types- text password checkboxes, radio buttons, submit and reset buttons, select tag, text area tag.

### **1. Introduction to Java Script**

Origins of Java script, Java script characteristics, Common programming concepts Java & Java script, Server Side vs Client Side Application, Annotating Code with Comments

### **2. Working with Variables & Data**

Communicating with the user, Variables Keyword and Reserved Words, Expression Operators, The on Load Event Handlers, Functions, Methods and Events, Defining Function, Calling a Function,

### **3. Controlling Programme Flow & The *do.....while* Statement**

The *if else* statement, the *while* statement, the *for* statement, the *break* statement, the *continue* statement, the *switch* statement

### **4. The Java Script Object model**

The Java Script Object Hierarchy Model Commonly Used Objects, The window Object The with statement, The document Object The Image Object The history Object The location Object The navigator Object

### **5. Java Script Objects**

Java Script Language Objects, The string Objects, string Objects Methods, Evaluating Strings, The Array Objects, The Date Time Objects, The Math Objects, The form Objects, The buttons Objects, The checkbox Objects, The Text & text area Objects, The radio button Objects, The select Objects, Form validation.

### **1. Active Server Pages**

ASP Mechanics, What are ASP Features? Virtual Directories and ASP Applications ASP Delimiters, Starting Web Applications, How ASP page gets executed.

### **Using VB Script**

Differences Bet. VB Script and Java Script, Declaring Variables with VB Script Program Flow

### **2. ASP Intrinsic Objects**

Scripting Context, Server, Application, Sessions, Request, and Response Objects, error, Cookies

### **3. Active X Data Objects**

Open Database Connectivity (ODBC) and Ole DB, Active X Data Objects, Registering Data Source names

### **Reference Books:**

Hands on HTML – Greg

Robertson Html 4.0 – Xavier

Html Complete reference – Janan Platt

Teach Yourself HTML 4- Dick Oliver

Teach Yourself in 21 days Asp – BPB Publication

Teach Yourself JavaScript in 24 hrs - BPB

Publication ASP Unleashes - BPB Publication

Abc of Java Script - BPB Publication

## **BCA-243 Structured System Analyses and Design**

### **1. System Concept and the information system environment**

System concept definition, Characteristics of system, Boundaries and interface, Open and closed system, Types of system



## 2. **Phases of Software Development Life Cycle**

What are problem, Feasibility study, analysis, design, implementation, and maintenance.

## 3. **The role of System analyst**

Academic and professional qualifications, the multifaceted role of the analyst, Change agent, Investigation and monitoring, Architect, Psychologist, The analyst/ User Interface, MIS organization

## 4. **Different approaches to Software Development**

Waterfall model, Spiral Model, Prototyping, RAD, Object oriented

## 5. **Structured System Analysis Tools and Techniques**

Fact finding tools and techniques, Functional Decomposition Diagram (FDD)

## 6. **Application System Modeling**

ER model (Data Modeling), Data Flow Diagram (Process Modeling)

## 7. **Database Design Methods**

Mapping ER diagram, Data Normalization techniques

## 8. **Logic representation techniques**

Decision trees, Decision tables, Structured English

## 9. **Input/output form design**

Input data, input media and devices, output design, form design, classification of form, form control

## 10. **System testing and quality assurance**

Nature of test data, test plan, system testing, quality assurance, audit trail

## 11. **Hardware and software selection**

Hardware suppliers, software suppliers, service suppliers, procedure for hardware and software selection

## 12. **Implantation and software maintenance**

Request for review, review plan, software maintenance, Maintenance procedure, reducing maintenance cost.

## 13. **Project scheduling and software**

Why does system fails, project management

## 14. **Security and Recovery of systems**

System security, Recovery planning

### **Reference Books:**

System Analysis and Design	-	V. Raja Raman
Introduction to system Analysis	-	Skidmore
Introduction to system Design	-	Skidmore
System Analysis and Design	-	Elias M. Awad

## **Elective - I**

### **BCA-244 –Principles and Practice of Management (PPM-1)**

#### 1. **Nature of management :**

- Meaning , Definition
- Nature of mgmt.
- Importance of mgmt.
- Functions of mgmt.
- Management as an art , a science and a profession
- Distinguish between management, organization and administration

#### 2. **Evolution of Mgmt. thought :**

- Contribution of F.W.Taylor
- Contribution of Henry Fayol
- Contribution of Elten Mayo
- Various approaches to management

#### 3. **Planning :**

- Meaning, definitions
- Nature , objectives
- Importance
- Process of planning
- Types of plans

- f. Advantages
- g. Disadvantages
- 4. **Forecasting:**
  - a. Meaning
  - b. Methods
  - c. Techniques
  - d. Sales forecasting:
    - a. methods of sales forecasting
  - e. Advantages
- 5. **Decision making:**
  - a. Meaning and definitions
  - b. Types of decisions
  - c. Process of decision making
- 6. **Organizing:**
  - a. Meaning and definitions
  - b. Importance of organizing
  - c. Features of organizational structure
  - d. Types of organization:
    - a. Line
    - b. Line and staff
    - c. Functional
    - d. Committee e.
  - Departmentalization
  - f. Span of management
  - g. Delegation of authority
  - h. Centralization and decentralization

**Reference Book:**

Principles & practices of management – Dr. Shejwalkar

Human Resource Management P.C. Pardeshi (Nirali Prakashan)

Principles and practice of Management- Dr. P. C. Pardeshi (Ujwal Prakashan)

## Elective – I

### BCA-245 – Cyber Security Level - 1

Chapter 1 Basics of Networking

Chapter 2 Introduction To Cyber Security And Ethical Hacking & What Is Social Engineering? Chapter 3 Information Gathering

Chapter 4 Operating System Attacks

Chapter 5 Application Attacks

Chapter 6 Reverse Engineering & Cracking

Techniques Chapter 7 Email Hacking

Chapter 8 Malware Attacks & Countermeasures

Chapter 9 Networks Based Attacks

Chapter 10 Ids & Firewalls

Chapter 11 Cryptography with Different Application

# **Elective - I**

## **BCA 246 – PC Maintenance**

### **Chapter -1** Introduction to Personal Computer

Block Diagram of PC. Function of each block. What is Hardware? What is software? Types of Software - system software- BIOS and Operating system and Application software. What is Data? Brief history of PC technology. Components of PC.

## **Chapter -2** Motherboards , I/O Slots, Expansion Slots, Buses

Types of Motherboards, Form Factors, Components of motherboards, Chipsets, Northbridge Southbridge, Memory slots, External cache memory , Processor sockets, Integrated I/O ports, Computer BUS, Expansion bus slots, CPU Architectures and Modes of Operations, Modes of Operation, Hyper Threading Technology.

## **Chapter -3** Processor, Sockets ,Slots and BUS architecture

Function of CPU Socket, Types of CPU Sockets, Installation of CPU on Motherboard, Processors, Characteristics of Processors, How a CPU Works, Intel i3, i5 and i7 Processors, BUS Architecture, CPU FSB, 32-Bit versus 64-Bit Bus, Memory BUS, Expansion bus slots

## **Chapter -4** BIOS and Cache Memory

BIOS/firmware, Sample Beep codes, POST and Features of BIOS/Firmware, Plug & Play BIOS, Flash BIOS Upgradation, Cache Memory, Cache miss, Cache Hit

## **Chapter -5** Memory Management

Primary Memory, Logical Memory, Organization of conventional memory - Extended and Expanded memory, Overview and features of SDRAM, DDR, DDR2 and DDR3 RAM, Error Checking Memory, (ECC RAM), Parity RAM non-parity RAM, Logical, Extended and expanded memory.

## **Chapter-6** Storage Devices

Floppy Disk Drives, Disk Controllers, Hard Disk Controller (HDC), Hard Disk Drives, Types of Drive Interfaces, Parallel ATA (PATA) and Serial ATA (SATA) comparison, Difference between SATA I, SATA II and SATA III, SCSI Controllers, SAS Technology, Managing disks, Basic disks, Disk Partition, Benefits of multiple partitions, Disadvantages of multiple partitions, Types of partitions, Dynamic disks, File systems, *FAT*, *FAT32*, NTFS (New Technology File System), File extensions, File attributes, Optical Media Storages, Compact Disc (CD), BD vs. DVD.

## **Chapter-7** Display Devices

Types of Display Devices, Video technologies, The Monitor, Working of CRT Monitor, LCD Monitors, Projectors, The Technical Differences between LCD and DLP, How DLP Projectors Work, The Advantages of DLP Technology, Disadvantages to DLP Projectors, How LCD Projectors Work, The Advantages of LCD Technology, The Weaknesses of LCD Technology, How LED Projectors Work, The Advantages and Disadvantages to LED Projectors, Wireless projector capabilities, The advantages of wireless projectors, Types of wireless projectors, Security of wireless projectors

## **Chapter -8** Input Output Devices

Types of I/O devices, The Keyboard, Internal Working of the Keyboards, Different types of computer keyboards, Ergonomic Keyboard, Personal System (PS/2) Keyboard, Mini PS/2 Keyboard, Multimedia Keyboard, Internet Keyboard, Wireless Keyboard, Gaming Keyboard, Mouse, Inside of a Mouse, How does a mouse actually work? Inside an optical mouse, How an optical mouse works, Mouse Interface Types, Pointing devices, Trackball, Touchpoint, Touchpad, Touch Screen, Printers & Scanners, Characteristics and Capabilities of Printers, Impact printers, Inkjet Printers, Thermal Printers, Laser Printers, Scanners, 1 All-in-One Devices Flatbed Scanners, Handheld Scanners, Drum Scanners, Bar Code Scanners, Fingerprint scanner, Modems, broadband modems, How broadband Internet works?

**Chapter - 9** Power Supply and UPS

The Power Supply (SMPS), Power Supply Connectors, Table 1-1 Power Color Codes, Different connectors, Hot Swap Power Supply, Power supply problems, Power Protection Devices, Surge suppressor, Uninterruptible power supply (UPS), Online and Offline UPS, Standby power supply (SPS), The Main Power Problems, Surge / Spike, Line Noise, Brownout / Under voltage/ Sag, Swell / Overvoltage, Blackout / Power Outage, The Solution for power Problems.

## **Chapter -10 I/O Ports, Cables, NICs, Wi-Fi and Bluetooth**

Use of I/O ports, Serial ports & Cables, USB Ports and Cables, USB 3.0 Highlights and Benefits over USB 2.0, FireWire Ports and Cables, Parallel Ports and Cables, SCSI Ports and Cables, PS/2 Ports, Audio Ports, Video Ports and Connectors, Network Interface Card, Types of Network Interfaces, Wireless or Wi-Fi Ethernet, Working of Wireless Networks, Examples of Wi-Fi Devices, Examples Of Wireless Networks, Wi-Fi Ethernet Standards, IEEE 802.15(Bluetooth) Interrupt Request Lines

## **Chapter -11 Computer Maintenance**

POST and its sequence, Preventive Maintenance, *Passive* preventive maintenance, An *active* preventive maintenance, Hardware Maintenance, Software Maintenance, Active Preventive Maintenance Procedures, Basic diagnostic procedures, Basic troubleshooting tools, screwdrivers, Long nose pliers, Flashlight, Soldering iron, Wire strippers, Multimeter, Crimping Tool, Software tools and utilities, Bootable disks, Power-On Self-Test, Hard Drive Self-Test, Software diagnostic tools, Identifying problems, Preventive Maintenance (PM) in Depth, Laptop Preventive Maintenance (PM), Computer Virus, What is Antivirus?, Software Preventive maintenance procedures, Security policies.

## **Chapter - 12 Basics of an Operating System**

What is an Operating System? Its functions, Desktop operating System, Network Operating system, Modes of operation, Windows 7 Editions, Windows 7 Hardware Requirements, Windows 7 Installation Procedure, Windows 8.1 Editions, Minimum Hardware for common resources, Windows 8.1 Installation Methods

### **Reference Books:**

Troubleshooting and maintaining your PC -All in one for Dummies - Dan Gookin

PC Maintenance- An introduction to upgrade and repair –Colin Grimstone

## **BCA 247 - Operating System**

### **UNIT 1 - Basics of Operating systems.**

Definition, functions of operating systems. Typical operating systems - Dos, Window. Types of windows and its basic features

### **UNIT 2 -PROCESSOR MANAGEMENT:**

Introduction to State Model, Job Scheduling, Process Scheduling, Multiprocessor Systems, Process Synchronization

### **DEVICE MANAGEMENT:**

Introduction to Techniques for Device Management, Device Characteristics – Hardware Consideration, Channels and Control Units, Device Allocation Considerations, Virtual Devices, I/O Programming, Interrupt Structure and Processing.

### **UNIT 3**

### **MEMORY MANAGEMENT:**

Introduction to Single Contiguous Allocation, Introduction to Multiprogramming, Partitioned Allocation, Relocation Partitioned Memory Management, Paged Memory Management, Demand – Paged Memory Management, Segmented Memory Management, Segmented and Demand – Paged Memory Management, Other Memory Management, Future Trends in Memory Management.

#### **INFORMATION MANAGEMENT:**

Introduction to a Simple File System, General Model of a file System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System, Device Strategy Module.

#### **UNIT 4**

#### **INTERDEPENDENCIES: PERFORMANCE EVALUATION**

Memory Management, Processor Management, Device Management, Information Management, Influences, Swapping versus Paging,

#### **FILES SYSTEM**

File system, File management, types of file systems and security for the same. Disk management and backup management for the same. Types of backup.

Newly Added: Introduction to Android

#### **Reference Books:**

Operating Systems – Colin Ritchie

Operating System Concepts- Dhamdhare

Operating System Principles- Silberschatz

Operating Systems - Madnick & Donovan

**BCA-248 Practical – Adv. Web**

**Designing Second Year III<sup>rd</sup> Semester**

**BCA-341- C++**

#### **INTRODUCTION**

C++ programming Basic

Object Oriented programming, Characteristics, Advantages of object Oriented programming over procedural language.

#### **INTRODUCTION TO C++, EXTENSION OF C**

Data types, constants, references, Variable, Loops and decisions Arrays, strings and Structures Revision

Classes and objects

#### **INTRODUCTION TO C++ CLASSES:**

Data Members, Functions, Scope resolution operator, Access specifier

New, delete operator, Static members.

#### **CONSTRUCTOR and DESTRUCTOR**

Encapsulation, Inline functions, and default parameters Pointers and 'This' pointer

#### **OVERLOADING:**

Function Overloading, Operator

Overloading Default Arguments

#### **INHERITANCE:**

Base class, derived class, Virtual Class, Abstract class.

#### **POLYMORPHISM**

Virtual functions, Pure Virtual functions and

abstraction Function Overloading and ambiguities

All remaining types of functions

#### **STREAM CLASS, FILE INPUT/OUTPUT.**

FStream classes, working with files with functions for reading and writing

#### **EXCEPTION HANDLING.**

Fundamental, Multiple catch statements, catching all exception

Templates concept

### Reference Books:

Complete Reference C++ - Herbert Schildt  
Object Oriented Programming C++ - Robert Lefore  
C++ - Yashwant Kanitkar  
Object Oriented Programming Language C++ - Balguruswami

## BCA – 342 Database Management Systems (DBMS)

### 1.0 Objectives

- 1.1 Storage devices characters
- 1.2 File Organization
  - Sequential Files
  - Indexing and methods of indexing
  - Hash files

### 2: Introduction To Database Systems

- 2.0 Objective
- 2.1 Introduction To DBMS
  - 2.1.1 What is Data, Database system, DBMS?
  - 2.1.2 Single and Multi-user systems
  - 2.1.2 Advantages and drawbacks of DBMS
  - 2.1.3 Architecture of DBMS
  - 2.1.4 Users of DBMS
  - 2.1.5 Roll of Database Administrator
- 2.2 Components of DBMS
- 2.3 Types of DBMS
  - Hierarchical
  - Network
  - Relational
- 2.4 Why RDBMS?
- 2.5 Features of RDBMS
- 2.6 Attributes, tuples & tables, codd's rules

### 3: Entity Relationship Model

- 3.0 Objectives
- 3.1 Entity Relationship Model
  - 3.1.1 Entity set
  - 3.1.2 Relationship set
  - 3.1.3 Attributes and values.
- 3.2 Weak and Strong Entity
- 3.3 Keys in DBMS
- 3.4 Conventions for drawing ERD
- 3.5 Abstraction
- 3.6 Generalization

### 4: DBMS Concepts

- 4.0 Objectives
- 4.1 ACID Properties
- 4.2 Concurrency Control
- 4.3 Recovery Mechanisms
- 4.4 Views And Security
- 4.5 Integrity Constraints
- 4.6 Data Security



## **5: Relational Database Design**

### 5.0 Objectives

### 5.1 Need For Proper Database

### 5.2 Undesirable Properties Of Bad Database Design

### 5.3 Functional Dependencies

### 5.4 Normalization Using FDS

1 NF

2 NF

3 NF

BCNF

### 5.5 Properties Of Decomposition

Loss less Join

Dependency Preserving

## **6: SQL Relational Database Design**

### 6.0 Objectives

### 6.1 Introduction

### 6.2 DDL

### 6.3 DML

### 6.4 DCL

### 6.5 Simple Queries

## **7: Security**

### 7.0 Objectives

### 7.1 Granting access to users

### 7.2 Extending and restricting privileges

### 7.3 Using views of security

## **8: Transaction Processing**

### 8.0 Objectives

### 8.1 Transaction, transaction processing

### 8.2 Properties of Transaction

### 8.3 Schedules

### 8.4 Serializing and its need

## **9: Backup and Recovery**

### 9.0 Objectives

### 9.1 Types of failure and storage systems

### 9.2 Need for backup and recovery

## **10: Concurrency Control & Recovery Techniques**

### 10.0 Objectives

### 10.1 Concurrency problems

### 10.2 Concurrency control mechanisms

### 10.3 Deadlocks

### 10.4 Deadlocks handling detection and prevention

## **11: Introduction To Data Warehousing And Data Mining**

### 11.0 Objectives

### 11.1 Data Warehousing

### 11.2 Data Mining

## **Reference Books:**

Introduction to Database Systems – C.J.Date

Database System Concept – Korth  
Data Management Systems – Alexis leon, Mathew Leon  
Principles of Database Management – James Martin  
Fundamentals of Database Systems - Navathe

## BCA – 343 VB.NET

- 1- .Net Fundamentals:** Introduction to .NET Framework, Distributed Architecture and .NET, .NET Common Language Runtime, Introduction to XML, SOAP protocols.
- 2- VB.Net Introduction to VB.Net with overview of .NET Framework:** VB.NET Vs VB 6.0, what can be done with VB.NET, Windows application, Windows Controls, ASP.NET Projects, Web Services, .NET Components
- 3- VB.NET Language Essentials:** Data Types, Operators, Control Statements, arrays, jagged array, Property.
- 4- Object Oriented Programming Overview:** Object Oriented Programming Concept, Classes & Objects, Type by Val, Type byRef, Inheritance, Abstract Classes & Interfaces.
- 5- Developing Windows Applications:** Win Forms, GUI Controls – Properties & Methods, MDI Forms, Inheritance Picker, Message Handling, Common Dialog Boxes, Common Controls.
- 6- Structured error Handling:** Exception – try – catch – finally – End try block, Nested Exception, Throwing Exception, User defined exception
- 7- Com object, interoperability:** Com Model in .Net framework, Interoperability with VB-6.0 Com objects.
- 8- File Stream:** Memory Stream, File Stream, Buffered Stream, Binary Readers, writers, Stream reader writers,
- 9- Collection,** Array list, hash table, sorted list and examples of stack and queue.

**ADO.NET:** Database Connectivity.(Take SQL Server as database) Connected, disconnected architecture, properties of dataset, reader, adapter etc.

### Reference Books:

Programming Microsoft Visual Basic .Net – Francesco Balena  
The Complete Reference- Visual Basic .Net- Jeffrey R. Shapiro  
Murach's VB.NET database programming with ADO.NET – AnnePrince and Doug Lowe  
The Visual Basic.NET COACH  
The Visual Basic.NET 2003 in 21 Days – Steven Holzner, SAMS  
Publications Mastering Crystal Report – BPB Publication  
Crystal Report- The Complete Reference – Tata McGraw Hill

## BCA-344 E-Commerce

### I Basic web commerce concepts, electronic commerce modes:

overview, EDI, electronic commerce with www-internet, commerce net advocacy.

### II Approach to safe E-commerce:-

secure transport protocol and transaction, SEPP, SET, certificate for authentication, security

on web server and enterprise network.

### **III Electronic cash and Electronic payment scheme:** Internet

monetary payment and security requirements; Payment & purchase order process, Online Electronic cash.

### **IV Internet/Intranet Security issues and solutions:**

Needs for computer security, security strategies, Encryption.

MasterCard/visa secure Electronic Transaction: Introduction requirements and concepts, payment processing.

### **V Internet & web site Establishment:**

Internet Resources for commerce: introduction, Web server Technologies, internet tools Relevant to commerce, internet applications for commerce.

### **VI Law related to IT ACT,**

Mobile and wireless computing fundamentals.

### **Reference Book:**

Daniel Minoli & Emma Minoli : Web Commerce Technology Hand

Book Martyn Mallick : Mobile & wireless design essentials.

**OR**

**BCA-345 Soft Skills**

**BCA-346 Practical – VB.Net**

**BCA-347 Practical – C++**

## **Semester -IV**

**BCA-441- Java**

### **1. The Genesis of Java**

Creation of Java, Why it is important to Internet, characteristics of Java

### **2. Basics of Programming**

Data types and variables, Arrays operators Types casting and conversion Condition & looping constructs Clauses and methods Overloading Inheritance

### **3. Packages & Interfaces**

Defining Packages, Understanding & catch class path Access protection, Importing Packages, interfaces

### **4. Exception Handling**

Exception types ,Using try & catch, Nested try, Using throw , throws finally Built in Exception, Creating & using own Exception ,Subclasses

### **5. String Handling**

String constructions, String operations, Standard String methods

### **6. Multithreading**

Thread Life Cycle, Thread's priorities, synchronization, runnable interface, IsAlive () & Join ().Deadlock

### **7. I/O**

Streams, byte Streams, Char Streams, Reading console I/P, Writing Console O/P file I/O, sterilization

### **8. Applet Programming**

Applet basics, Simple display methods. Repainting passing parameters

### **9. Event Handling**

Event Classes, Sources of Events, Event listeners

## 10. User Interface

AWT classes Windows fundamentals, Component-window, Container-frame

Panel –canvas            Checkbox, group list scrollbar

Graphics                Text field, text area

Colors                   Menus dialogs.

Fonts                    AWT-controls-layout manager

Labels

Buttons

## 11. Introduction to Swings

Japplet, Icons, Labels, Text fields, Button, Combo Box, Tabbed panes, Scroll Panes, Trees, Tables

### Reference Books:

Complete reference Java - O'reilly Complete

reference Java 2 – Herbert Schildt

## Elective II

### BCA-442 Business Applications

#### 1. Sales Order Processing System

Sales Enquiry & preparation of  
Quotation Order acceptance

Dispatch & Invoicing

Sales Analysis (based on products,  
Customers) Sales Invoice

#### 2. Purchase Order Processing System

Enquiry & receive Quotation Vendor  
selection (Vendor analysis)

Order preparation (with delivery  
schedule) Order amendment

Receipt of material (goods inward /  
GRN) Supplier's bill passing

Follow up of pending purchase order

#### 3. Inventory Management System

Stock accounting & control  
(raw material, work-in-progress, finished goods

) Stores transactions (Receipts, Issues &  
adjustments) Bin card & Stock ledger

Lead time

BOM processing with product configuration

Inventory levels – EOQ – ABC analysis

Inventory control Reports (slow moving - non moving items)

#### 4. Hotel Management System

Enquiry & Booking (Room  
reservation) Room & Services details

Check-in, Stay & Check-out of  
customer Billing

### Books:

MIS by W.S. Jawadekar

MIS by Jerome Kanter MIS

by Gordon B. Davis MIS by

Laudon and Laudon

Marketing Management by Philip Kotler Production

and Operations Management by Mayer Modern

Production Management by R V Badi

## Elective II

### BCA 443 – Cyber Security Level – II

CHAPTER 1 I.T. ACT 2000 & ITS AMENDMENTS  
CHAPTER 2 CASE STUDIES FOR SECURITY  
ANALYSIS CHAPTER 3 PC AUDITING & FACING  
MALWARES CHAPTER 4 LINUX ESSENTIALS  
CHAPTER 5 WEB VULNERABILITIES &  
ATTACKS CHAPTER 6 FINANCIAL FRAUDS  
CHAPTER 7 TECHNICAL ATTACKS ON WIRELESS &  
DATABASES CHAPTER 8 PENETRATION TESTING

## **Elective II**

### **BCA-444 – Tally**

#### **Create company in tally**

- ✓ How to create company in tally, shot keys..
- ✓ Introduction to software.

#### **Groups & ledgers in tally**

- ✓ Groups-28 groups in tally & its explanation,
- ✓ Difference between groups & ledgers
- ✓ How to create groups & ledgers in tally

#### **F11 & F12 features in tally**

- ✓ Complete explanation of F11 & F12 features in tally
- ✓ Its importance & difference between the same.

#### **Voucher entries in tally**

- ✓ Types of Vouchers in tally, its uses with example.

#### **Bank Reconciliation**

- ✓ Definition, meaning of Bank reconciliation
- ✓ Reasons to get difference in Pass Book & cash book
- ✓ Bank reconciliation with tally

#### **Bill-wise details in tally**

- ✓ How we can maintain bill-wise details in tally
- ✓ Outstanding report after maintaining bill-wise details

#### **Interest calculations in tally**

- ✓ How to activate interest calculation in tally

#### **Reporting**

- ✓ How to generate Financial Reports in tally...  
likewise. Balance sheet, cash flow, funds flow, group summary, ... etc
- ✓ MIS Reports like.. Ratio Analysis

## **Key combinations**

### **Shot keys to work fast in tally.**

#### **Tally Inventory**

- ✓ Inventory groups, Items, categories..
- ✓ Unit of measure, Godown creation
- ✓ Example for understanding
- ✓ Inventory Vouchers

#### **Cost-Centers in tally**

- ✓ How to activate cost –centers in tally
- ✓ Example for better understanding
- ✓ How to generate reports

#### **Budgetary control**

- ✓ What is budgetary control
- ✓ How it is important for management
- ✓ How to make budget in tally and see variance

#### **Export & Import of data from tally**

- ✓ How to Import data from tally to tally
- ✓ How to Export data from tally to other applications

#### **Backups, Restore, Printing Reports & tally security (P)**

#### **Introduction to VAT**

- ✓ General introduction to VAT
- ✓ How tally facilitates to calculate VAT

## **BCA -445 ORACLE**

1. Introduction to RDBMS
  - What is RDBMS
  - Difference between DBMS & RDBMS
2. SQL (Structured Query Language)
  - Subdivisions of SQL
  - DDL, DML ,DCL with all commands
  - Data Types
  - The CREATE TABLE Command,
  - Constraints in CREATE TABLE
  - Inserting Data into tables
  - Viewing Data in the tables ( SELECT with all options )
  - Sorting data in a table (Order By)
  - Group By, Having clause
  - Delete operations
  - Updating the contents of the table
  - Modifying structure of a table
  - Renaming table, Truncating tables, Destroying table
  - Data Constraints (Primary Key, Foreign Key, Unique Key, Check, Default, NOT NULL )
  - Computations done on Table data (Arithmetic Operators, logical operators, range searching, pattern matching(LIKE)
  - Functions (Aggregate functions, Numeric Functions, Character Function, Date function, Conversion function)
  - Sub queries
  - Joins (Simple Join, inner join, outer join, cross join)

### 3. Oracle Objects

Views

Sequences

Index

### 4. PL/SQL

Introduction to PL/SQL

Architecture of PL/SQL

Data types

PL/SQL blocks (attribute- %TYPE, %ROWTYPE)

Operators, functions, comparisons, numeric, character, date

Control Statements

1. Conditional control (if statement)

2. Interactive control (Loops)

3. Sequential Control (GOTO statement)

### 5. Error Handling (Exception handling)

Pre-defined,

User defined

### 6. Functions, Procedures

### 7. Cursors

Definition

Types of cursors (Implicit, explicit)

### 8. Triggers

### 9. Packages

#### Reference Books:

Microsoft SQL Server &.0 DBA Survival Guide – Orryn Sledge , Mark Spenik

Fundamentals of Database Systems- S.B. Nawathe, Ramez Elmasri

Teach Yourself SQL in 21 Days- Ryan K.. Stephens

The Programming Language of Oracle – Ivan Bayross

Using Oracle Application – Jim Crum

## BCA -446 Environmental Studies

### Unit 1: Introduction to environmental studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

(2 lectures)

### Unit 2: Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

### Unit 3 : Natural Resources : Renewable and Non-renewable Resources

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

(8 lectures)

#### **Unit 4 : Biodiversity and Conservation**

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity : Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(8 lectures)

#### **Unit 5 : Environmental Pollution**

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

(8 lectures)

#### **Unit 6 : Environmental Policies & Practices**

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

(7 lectures)

#### **Unit 7 : Human Communities and the Environment**

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(6 lectures)

#### **Unit 8 : Field work**

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site--Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems--pond, river, Delhi Ridge, etc.

(Equal to 5 lectures)

#### **Reference Books:**

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36--37.



7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29-64). Zed Books.
8. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971.*Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.*Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. Tripathi 1992.
14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

## BCA -447 Practical-JAVA

## BCA -448 Practical-ORACLE

### THIRD YEAR

### SEMESTER –V

### BCA-541 ASP.Net

#### 1. Introduction to ASP.NET

The .NET Framework, The .NET programming Framework, .NET languages, The .NET class library, ASP vs. ASP.NET, About ASP.NET, Basic difference between C# and VB.NET

#### 2. ASP.NET 2.0

Features of ASP.NET 2.0, Stages in Web Forms Processing, Introduction to Server Controls, HTML Controls, Validation Controls, User control, Data Binding Controls, Configuration, Personalization, Session State

#### 3. Declaring Variables in ASP.NET

Data Types, Initializes, Arrays, Enumerations. Variable Operations- Advanced Math Operations, Type Conversions. Object Based Manipulation - String Object, Date Time Object, Time span object & Array Object. Conditional Structures, Loop Structures, Functions & Subroutines – Parameters, Procedure Overloading, Delegates.

#### 4. Web Server and User

Installing IIS. IIS Manager- Creating a virtual directory, Virtual directories and Applications, Folder Settings, Adding virtual directory to your neighborhood.

#### 5. ASP. NET Applications

ASP.NET file types, the bin directory, code-behind, The Global.asax, Understanding ASP.NET classes. ASP.NET configuration

#### 6. Overview of ADO.NET

ADO.NET architecture, Accessing Data using data adapters and datasets, using command and data reader, binding data to data bind controls, displaying data in data grid.

#### Reference Books:

- 1) The complete Reference ASP.NET by Matthew MacDonald- Tata McGraw-Hill.
- 2) Professional ASP.NET – Wrox Publication

## BCA - 542 Linux

### Unit – I

Linux Operating System history. Basic features of Linux. Advantages of Linux. Basic architecture of Unix/Linux operating system. Overview of Linux kernel, kernel space, user space. System initialization. Linux file system architecture. Directory structure of Linux. Hardware requirement for Linux operating system.

### Unit – II

Basic Linux commands – cd , rm , touch, cat , mkdir , ls , date , cal pwd, file, login, logout, shutdown etc. Linux boot sequence. Different services in Linux – init services, xinetd services, sys V launched services. Daemon services. Standard input and output operators in Linux. Shells in Linux. Bash shell features.

### Unit –III

Vim Editor

Introducing Vim. Vim basics. Opening file in Vim, modifying file in Vim, saving file and exiting from Vim. Modes of Vim – Command mode, Insert Mode, and exit mode. Different command options used in Vim.

#### **Unit – IV**

File Management in Linux. , File structure in Linux. Disk partitioning, managing partitions, making file systems, mount points and /etc/fstab. Mounting file system with mount. Unmounting file system. Managing swap partitions and swap files. Mounting NFS file systems.

#### **Unit – V**

Backup Management In Linux, Archiving tools – Tar command, dump/restore command. Gzip, bzip2 gunzip and bunzip2 commands.

#### **Unit – VI**

Package management in Linux. Study of rpm (Red Hat Packager) in details Print management in Linux. Study of printing commands.

#### **Unit –VII**

User Administration in Linux, Adding new user account, creating groups, modifying /deleting user accounts, password aging policies, usermod command. Study of /etc/passwd, /etc/shadow and /etc/groups files. Switching users using su command.

#### **Unit –VIII**

File permissions in Linux, Default file permissions, changing file permissions, chmod and chown commands, and special file permissions – SUID, SGID and stickybit.

#### **Unit – IX**

Shell Programming, Basic shell programming, shell programming in bash shell. Read command, conditional and loop statements. Case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automatic system tasks.

#### **Reference Books:**

Linux – The Complete Reference 6<sup>th</sup> Edition – Richard Petersen  
Fedora & Red Hat Enterprise Linux Bible – Christopher Negus  
Beginning Linux Programming – Christopher Negus

## **BCA-543 Software Testing (SQT)**

### **1 Quality Concept**

- 1 Definition of Quality, QA,
- SQA 2 Quality factors
- 3 Software Quality Metrics
- 4 Process Improvement
- 5 Process and Product Quality
- 6 The SEI Process Capability Maturity model, ISO, Six-Sigma
- 7 Process Classification

### **2 Software Quality Assurance & Software Reliability**

- 1 Need for SQA
- 2 SQA Activities
- 3 Building blocks of SQA
- 4 SQA Planning & Standards
- 5 Reliability Measures
- 6 Reliability models

### **3 Verification & Validation**

- 1 Verification & Validation Planning
- 2 Software inspections
- 3 Automated static Analysis

### **4 Software Testing Fundamentals**

- 1 Testing objectives
- 2 How test information flows
- 3 Testing lifecycle
- 4 Test Cases – What it is? Test Case Designing (Concept & introduction should be covered here. Detailed techniques should be covered in Unit No. 2.4)

### **5 Levels of Testing**

- 1 Unit Testing
- 2 Integration Testing
- 3 System Testing
- 4 Acceptance Testing
- 4.1 Alpha testing & Beta testing
- 5 Static vs. Dynamic testing
- 6 Manual vs. Automatic testing
- 7 Testers workbench
- 8 11-steps of testing process (Only steps should be covered)

### **6 Different types of Testing**

- 1 Installation Testing
- 2 Usability testing
- 3 Regression testing
- 4 Performance Testing
- 4.1 Load Testing
- 4.2 stress testing
- 5 Security testing

### **7 Static & Dynamic Testing**

- 1 Static Testing Techniques
- 2 Review types: Informal Review, Technical or peer review, Walkthrough, Inspection, static analysis
- 3 Review Meeting,
- 4 Review Reporting & Record keeping, Review guidelines & Review checklist
- 5 Data flow analysis
- 6 Control flow analysis
- 7 Cyclometric Analysis
- 8 Dynamic testing – need & Advantages

### **8 Black Box & White Box Testing (Test Case Design Techniques)**

- 1 Functional Testing (Black Box) Equivalence partitioning, BVA, Cause- Effect graphing, Syntax testing (Concept & Test case generation only)
- 2 Structural Testing (White Box) Coverage testing, Statement coverage, Branch & decision coverage, Path coverage

- 3 Domain Testing
- 4 Non functional testing techniques
- 5 Validation testing Activities Low level testing, High level testing
- 6 Black box vs. White Box

## **9 Testing specialized Systems and Applications**

- 1 Testing object oriented software
- 2 Testing Web based Applications

### **Reference:**

- 1. Software Engineering - R. Pressmen – 6th Ed
- 2. Software Engineering - Sommerville
- 3. Introducing Software Testing - Louise Tamres
- 4. Effective Methods for software Testing - William Perry
- 5. Software Testing in Real World - Edward Kit
- 6. Software Testing Techniques - Boris Beizer
- 7. Software quality assurance: Principles and Practices - Nina Godbole, Narosa Publishing

## **Elective III**

### **BCA-544 Principles and Practice of Management- II (PPM-II)**

- 1. **Staffing:**
  - a. Meaning , definitions
  - b. Importance
  - c. Recruitment and selection
  - d. Training and development
  - e. Performance appraisal
- 2. **Directing:**
  - a. Meaning , definitions
  - b. Principles of directing
- 3. **Communication:**
  - a. Meaning and definitions
  - b. Elements
  - c. Process
  - d. Importance
  - e. Types
  - f. Principles
- 4. **Motivation:**
  - a. Meaning and definitions
  - b. Objectives
  - c. Theories of motivation
    - a. Maslow's theory of hierarchy of needs
    - b. Herzberg's two factor theory
    - c. McClelland's theory
    - d. Expectancy theory
    - e. Equity theory
    - f. Reinforcement theory

- d. Special motivational techniques

**5. Leadership:**

- a. Meaning and definitions
- b. Features
- c. Importance
- d. Theories
  - a. Great man
  - b. Trait
  - c. Situational
  - d. Behavioral
  - e. Followers
  - f. Managerial grid
  - g. Path goal
- e. Styles of leadership
  - a. Autocratic
  - b. Participative
  - c. Laissez faire
- f. Qualities of a leader

**6. Controlling:**

- a. Meaning and definitions
- b. Features
- c. Control process
- d. Control techniques
  - a. Traditional
  - b. Modern

**7. Recent trends in management:**

- a. Social responsibility of mgmt
- b. Stress mgmt
- c. Total quality mgmt.
- d. Disaster mgmt.
- e. Event mgmt.
- f. M.B.O. (management by objectives)

**Reference Books:**

Principles of Management – Herald Koontz & O'Donnel McGraw Hill  
Principles & Practice of Management – L.M.Prasad Sultan Chand, Delhi  
Business Management – Dr. P.C. Pardeshi

### **Elective III**

### **BCA-545 – Cyber Security Level – III**

#### **1. CYBER FORENSICS & CYBER CRIME INVESTIGATION**

Cyber Crime as We Enter the Twenty-First Century, WHAT IS CYBER CRIME?, Specific computer crimes, hOW DOES TODAY'S CYBER CRIME DIFFER FROM THE HACKER EXPLOITS OF YESTERDAY?, REASONS FOR CYBER CRIME, INDUSTRIAL ESPIONAGE — HACKERS FOR HIRE, PUBLIC LAW ENFORCEMENT'S ROLE IN CYBER CRIME INVESTIGATIONS, THE ROLE OF PRIVATE CYBER CRIME INVESTIGATORS AND

SECURITY CONSULTANTS IN INVESTIGATIONS, The Initial Contact, Client Site Arrival, Evidence Collection Procedures

## **2. CYBER LAW**

“Cyber Law – An Indian Perspective”, What Is Cyber Crime? Emergence of Information Technology Act, 2000, Types of Attacks By Hackers, Types of Techniques used by the Crackers/ Cyber Terrorists, Measures To Curb Cyber Crime, Investigations And Search Procedures, Problems Underlying Tracking of Offence, How Efficient Is Information Technology Act 2000?, Data Protection, Process of Reporting Internet Frauds, WHAT IS A COMPUTER FORENSICS REPORT?, What Is an Expert Report?, A TEMPLATE FOR COMPUTER FORENSIC REPORTS, Attacker Methodology, User Applications, Internet Activity or Web Browsing History.

## **3. DIGITAL EVIDENCE & FRAUDS**

WHAT IS DIGITAL EVIDENCE?, Digital Forensic Examiner Proficiency and Competency Tests, Imaging Electronic Media (Evidence), Collecting Volatile Data, Analysis, Reporting, Firewall Forensics, The Value (or Not) of IP Addresses, Deciphering Port Numbers, Securing the Firewall, Network Forensics, Build a Monitoring Workstation, Analyzing the Data, Firewall Log Analysis and Management, Network Forensics Tools, Database Forensics, Testing For SQL Injection Vulnerabilities, Mobile Forensics, DIGITAL FRAUDS, Computer Crimes, Steps for Computer Crime Investigation.

## **4. Mobile Frauds & Countermeasures**

Mobile Forensics, Identification of Mobile, Cell Tracking, Types of LBS Technology, Case Study, Recovering Stolen Mobile, Here are steps on how to find a stolen or lost phone, Recover your stolen mobile using IMEI number, Identifying Fake SMS, Collecting Evidence to be presented in Court, How to take a Complaint from the Victim?, Do and don't for mobile user.

## **5. Forensic Data Acquisition/ Data Recovery**

The Forensics Process, Collecting Digital Evidence, Live vs. Dead analysis, Imaging electronic media (evidence), Collecting Volatile Data, Analysis, Comparison to Physical Forensics, Computer Forensics Certifications, TIMELY EVIDENCE COLLECTION AND CHAIN OF CUSTODY, “MARKING” EVIDENCE WITH AN MD5 HASH AND ENCRYPTION — CRCMD5 AND PGP, FILELIST, CRCMD5, SEALING EVIDENCE, USING SAFEBACK 2.0 TO TAKE AN IMAGE OF A FIXED DISK, TAKING A HARD DISK INVENTORY WITH FILELIST, Data Recovery, Recovering data after physical damage, Recovery techniques, Hardware Repair, Disk Imaging, Recovering data after logical damage, Preventing logical damage, Recovery Techniques, Consistency checking, Data carving.

## **6. Operating System Forensics**

WHERE EVIDENCE RESIDES ON WINDOWS SYSTEMS?, CONDUCTING A WINDOWS INVESTIGATION, Reviewing All Pertinent Logs, Event Viewer, Event Log Drawbacks, Where to Look for Evidence, IIS Logs, Reviewing Relevant Files, Incident Time and Time/Date Stamps, Where to Look for Evidence, Proprietary Email Files, Netscape Messenger Mail, Microsoft Outlook Mail, Deleted Files and Data, Temporary Files , Backup File Recovery, The Swap File, Broken Links, Web Browser Files, Looking for Unusual or Hidden Files, Remote Control and Remote Access Services, Administrative Shares, Reviewing Searches and Files Used, AccessData Registry Viewer, Registry Viewer Overview, Windows Registry Basics, Opening and Closing Registry Files, Forensic Analysis of a Live Linux System, Pt. 1 Mariusz Burdach 2004-03-22, Forensic Analysis.

## **Reference Book**

1. Computer Networks - Abndrew S. Tanenbaum 4th edition
2. Cyber-Forensics The Basics -Tim Vidas (CERTConf2006)
3. Digital Evidence - Harley Kozushko

4. Guidelines on Cell Phone Forensics - Wayne Jansen Rick Ayers (NIST Special Publication 800-10)

## **BCA-546 ENGLISH (Advance)**

## **BCA-547 Practical ASP.Net**

## **BCA-548 Practical Linux**

## **SEMESTER- VI**

## **BCA-641– Unified Modeling Language (UML)**

### **1. Getting started**

#### **1.1. Models**

- 1.1.1. Importance of modeling
- 1.1.2. Principles of modeling
- 1.1.3. Object-oriented modeling

#### **1.2. Review of Object-Orientation**

- 1.2.1. Objects and classes
- 1.2.2. Abstraction
- 1.2.3. Inheritance
- 1.2.4. Polymorphism
- 1.2.5. Encapsulation
- 1.2.6. Message passing
- 1.2.7. Associations
- 1.2.8. Aggregation

### **2. Introduction to UML**

#### **2.1. History**

#### **2.2. The components of the UML**

#### **2.3. Building blocks of the UML: Things, Relationships, Diagrams**

#### **2.4. Common mechanisms in the UML**

#### **2.5. Architecture**

### **3. Basic structural modeling**

#### **3.1. Classes**



- 3.2. Relationships
- 3.3. Class diagrams
- 4. Advanced structural modeling
  - 4.1. Interfaces, Types and Roles
  - 4.2. Packages
  - 4.3. Instances
  - 4.4. Object diagrams
- 5. Basic behavioral modeling
  - 5.1. Interactions
  - 5.2. Use cases and use case diagrams
  - 5.3. Interaction diagrams
  - 5.4. Activity diagrams
- 6. Advanced behavioral modeling
  - 6.1. Events and Signals
  - 6.2. State machines
  - 6.3. Processes and Threads
  - 6.4. Time and Space
  - 6.5. Statechart diagrams
- 7. Architectural modeling
  - 7.1. Components and Component diagram
  - 7.2. Deployment diagram
  - 7.3. Collaborations
- 8. New diagrams in UML 2.0

**Reference Books:**

Unified Modeling Language User Guide- Grady Booch, James Rumbaugh, Ivar Jacobson  
UML 2 for dummies – Michael Jaeasse, Chonoles, James A., Schardt  
Learning UML 2.0 – Russmiles, Kim Hamilton

**BCA-642– CTIT (Current trends in IT)**

- 1) **HTMH5**

Introduction, features, elements & attributes in HTML5, <canvas>, <video>, <audio>. Introduction to Scalable Vector Graphics (SVG), Geolocation, Form input types, HTML5 web storage. Introduction of HTML5 Web worker. CSS: Introduction to Style Sheet, types of style Sheets: Inline, External, Embedded CSS, Text formatting properties, CSS Border, margin properties, Positioning. Use of classes in CSS, color properties, use of <div> & <span>

## **2) Introduction to Android**

Introduction to Android: A little Background about mobile technologies, Android - An Open Platform for Mobile development, Android SDK Features, Android versions and features.

## **3) Tools for Development**

Installing Android, First Android application, Running on Emulator, Android development Tools, Eclipse, IDEs and Tools

## **4) Android Architecture and OOPS**

Building Blocks of Android, Java Classes and Objects, Class Methods and Instances, Inheritance and Polymorphism in Java, Interface and Abstract class.

## **5) Android UI & Advance JAVA**

Fundamental Android UI Design, Introducing Views, In Creating new Views, Introducing Layouts, Creating new Views, Using resources, Complex UI components, Building UI for performance, Using themes, Debugging Android Code.

## **6) Android Graphics and Multimedia**

Basic Graphics, Input Handling, Playing Audio & Video, Recording Audio and Video, Adding new media to media store, Raw Audio Manipulation.

## **7) Database and Content Providers**

Introducing Android Databases, Introducing SQLite on Android, SQLiteOpenHelper and creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes, Creating new content Provider, Using Content providers, Native Android Content provider.

### **References:**

Hello, Android by Ed Burnette

Professional Android 2 Application Development Paperback, Author, Reto Meier, Wrox Publications

Professional Android Application Development by Reto Meier, Wiley

India Pub. <http://developer.android.com>

## **BCA-643 Enterprise Resource And Planning (ERP)**

### **1. ERP :**

An Overview, Enterprise – an overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On- line Analytical Processing (OLAP), Supply Chain Management.

## **2.ERP IMPLEMENTATION:**

ERP Implementation lifecycle, Implementation Methodology, ERP implementation – The hidden cost, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP implementation.

## **3.THE BUSINESS MODULES:**

Business Modules in an ERP packages, Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

## **4.ERP – PRESENT AND FUTURE**

Turbo Charge the ERP System, Enterprise Integration, Application (EIA), ERP and E-Commerce, ERP and Internet, Future Directions in ERP.

## **Reference Books:**

Enterprise Resource Planning(ERP) - Aleix Leon(Tata Mc. Graw Hill)

## **BCA - 644 Organizational Behavior**

### **1. Organization & Organizational Behavior**

- Introduction
- Organization
- Organizational Behavior
- Intuition & Systematic Study
- Organization & Organizational Behavior
- Historical Evolution of Organizational Behavior Discipline
- Organizational Behavior to –Day
- Models for organizational Behavior

### **2. Perception & Individual Decision Making**

- Introduction
- Factors Influencing Perception
- Attribution Theory
- Frequently used Shortcuts in Judging others
- Specific Application in Organizations
- The Link between Perception & Individual Decision Making
- Improving Creativity in Decision Making
- How are Decisions actually made in Organizations?
- Individual Differences: Decision Making Styles
- Organizational Constraints
- Ethics in Decision Making

### **3. Personality & Attitude**

- Introduction
- Definition
- Theories on Personality
- The shaping of Personality
- Assessment of Freud's Stages Immaturity to Maturity
- Determinants of Personality
- Personality Traits

The Myers – Briggs Framework  
Major Traits Influencing Organizational Behavior  
Personality & Organizational Behavior  
Attitudes  
Formation of Attitudes  
Types of Attitudes  
Functions of Attitudes  
Changing Attitudes  
Ways of Changing  
Types of Change  
Attitudes & OB  
Job Satisfaction  
Job Involvement  
Organizational Commitment  
Values  
Job satisfaction

**4. Learning**

Nature of Learning  
Process of Learning  
Cognitive Theory of  
Learning Social Learning  
Theory Principles of  
Learning Schedules of  
Learning Learning Curves  
Learning & Organizational Behavior

**5. Motivation**

Introduction  
Intrinsic and extrinsic  
motivation Some theories on  
motivation Motivation and  
Performance Motivation  
strategies Importance of  
motivation Motivational drives

**6. Stress**

Introduction  
Model of stress  
Stress manifestation  
Coping strategies  
Coping and personality  
Sources of stress  
Stress management  
Organization approaches to stress management

**Reference Books:**

Organizational Behavior – Stephen Robins, Prentice hall Organizational  
Behavior – Ashwathappa, Himalaya Publishing House.

**OR**

**BCA-645 YOGA**

## BCA-646 Cloud Technology

### 1) Introduction to Linux Networking

(10 Hours)

Basics of linux OS, advance user management, permissions & Task Scheduling, RAID Implementation (RAID0, RAID1, RAID5, RAID6, RAID10), Logical Volume Management (LVM), software Management using rpm, yum.

Linux Networking: DHCP Server (Dynamic Host Configuration Protocol), Apache Web Server, FTP Server, NFS Server, CIFS Server, DNS Server, access control lists, Using other linux distributions (ubuntu, CentOS), understanding Routers & Switches, Security Enhanced Linux, using telnet, ssh, putty, using vnc, rdp, using GIT

### 2) Introduction to Virtualization

(4 Hours)

What is virtualization, concepts, Implementation of Virtualization. Implementation of remote accessibility, advantages & disadvantages, limitation. Relationship between Virtualization & Cloud Computing.

### 3) Virtualization for Enterprise

(6 Hours)

Virtualization for Enterprise: Vmware, Xen, KVM, Hyper-V, Virtual Box.

Bare Metal Virtualization (ESXi), iscsi Intro & Setup, NAS (Network attached storage) implementation, SAN (Storage Area Network) implementation, SNAPSHOTS, VLANS

### 4) Cloud Computing Fundamental

(6 Hours)

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud;

Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

### 5) Cloud Applications & Services

(6 Hours)

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

Cloud Services: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics: Cloud Computing infrastructures available for implementing cloud based services.

### 6) Selecting Cloud Platform

(4 Hours)

Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google)

### 7) Best Practice Cloud IT Model

(4 Hours)

Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO).

### Reference Books:

1. Distributed and Cloud Computing, 1st edition, Morgan Kaufmann, 2011.
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 978-0521137355]

3. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach [ISBN: 0071626948]
4. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539]

### **BCA-647- Project**