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 STATISTIICS
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 Diagraphs MEASURES OF DISPERSION
Measures of dispersion absolute and relative measure of depression, 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 : LogicTruth Tables-AND, OR, NOT

BCA-143 - Basic English

SECTION – I
1.   Grammar

a) Synonyms
b) Antonyms
c) One Word Substitution
d) Homophones & Homonyms

2.   Composition
Formal & Informal
Writing Precise
Essay Writing
Report Writing

Reading Comprehension
Reference Books:

High School English Grammer and Composition – P.C.Wren, H.Martin, N.D.V.Prasada Rao

Longman Grammer of spoken and written English – Douglab Biber, Stig Johansson, Geoffrey
Leech, Susan Conrad, Edward Finegan

Speaking English Effectively- Mohan Krishna and Singh N.

A handbook of Business Letter – frailly L.E

Organised Writing Book – Sarswati V.

Wiow-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 MANIPUALATION:

Introduction, Unformatted High level Disk Input Output functions, Character Input output in Files, Command Line Arguments, String Input Output in Files, Formatted High level Dist 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
TheClassificationofOral
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 Yorself 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**

7. **Database Design Methods**

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**

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 :*
    a. Meaning , Definition
    b. Nature of mgmt.
    c. Importance of mgmt.
    d. Functions of mgmt.
    e. Management as an art , a science and a profession
    f. Distinguish between management, organization and administration
2. *Evolution of Mgmt. thought :*
    a. Contribution of F.W.Taylor
    b. Contribution of Henry Fayol
    c. Contribution of Elten Mayo
    d. Various approaches to management
3. *Planning :*
    a. Meaning, definitions
    b. Nature , objectives
    c. Importance
    d. Process of planning
    e. 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
Principles and practice of Management-

         P.C. Pardeshi (Nirali Prakashan)
        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.

UNIT4

INTERDEPENDENCIES: PERFOMANCE 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- Dhamdhere

Operating System Principles- Silberschatz

Operating Systems - Madnick & Donovan

BCA-248 Practical – Adv. Web Designing Second Year IIIrd 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- Jefrey 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

        1. Conditional control (if statement)
        2. Interactive control (Loops)
        3. Sequential Control (GOTO statement)
    5. Error Handling (Exception handling)

    6. Functions, Procedures
    7. Cursors
Definition
Types of cursors (Implicit, explicit)

    8. Triggers
    9. Packages

Reference Books:

Microsoft SQL Server &.0 DBA Survial 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 landuse 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.

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.

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. Mouting file system with mount. Unmounting file system. Managing swap partitions and swap files. Mounting NFS files 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 6th Edition – Richard
Petersen Fedora & Red Hatnterprise 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 CaseDesign 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, Games 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 Developmentby 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 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

7 Group and Team
Objectives
Introduction
Key group Concepts
Implications on Performance and satisfaction
Group Behavior Model
Characteristics of Group Decision Making

Towards Improved Group Decision Making
Group Cohesiveness
Cohesiveness and Group Productivity
Team and Organizational Context for Teams
Team Work
Life Cycle of a Team
Ingredients of effective Team
Potential team Problem
Team Building
Types of Team
Self Managing Teams

8 Organization Structure and Design
Objectives
Introduction
Organization Structure
Organization Environment
Environmental Sectors
Characteristics of the Environment
Organization as Systems
Generic types of Organizations
Formal Organizations: Design and Structure
Division Labor and Task Interdependence
Work Specialization
Departmental Choices
Organizational Design
Product and Functional Organizations
Matrix Organization
Project Organization
Distribution of Authority

9 Leadership

Introduction
Types of Leaders
Leadership Styles
Relevant Conditions for Leadership Styles
Leadership Theories
Contingency Model Leader effectiveness
Fred Fiedlers Contingency Model
Path Goal Theory
Managerial Girid

10. Conflict Management
Objectives
Introduction
Organizational Conflict
Types of Organizational Conflict
- Causes of Conflicts
- Other sources of Conflict

Integration, Diffusion and Complementarily
Other resolution Technologies

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 ofCase Studies when deciding to adopt cloud computing architecture.How to decide if the cloud isright 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.   GautamShroff, 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