


**MAHATMA GANDHI UNIVERSITY  KOTTAYAM****BACHELOR DEGREE PROGRAMME  
IN  
COMPUTER APPLICATIONS  
(BCA)*****SCHEME & SYLLABUS***


(Effective from 2009 Admissions onwards)

**1. About the Course**

Technology is defined as the applications of Basic Science. The past two revolutions, industrial and electronic, have transformed the society from agricultural to industrial and then to electronic. The electronically based technologies focused in information gathering, processing and distribution. The use of this technology in all sectors gave the birth to Computer Industry and its unprecedented growth launched another revolution in Communication.

Information, the basic raw material for the Decision Support System, can be derived from processing of huge database related with different sectors. Systematic storage and management with adequate security are essential for data retrieval and processing to generate information. The information technology plays an important role in all areas. But the main drawback is the technophobia of the people to adapt with the new technologies. This may be due to lack of awareness of the merits and advantages of new technologies. So our youths have to be equipped with all kinds of knowledge tools to work with computers comfortably which are basic requirements to provide human resource to the industry. 

The radical changes in technologies, both hardware as well as software, and their ever increasing adaptation to newer areas of application, demand frequent updating of the academic curriculum so that the students can rise to the expectation of the Industry. The syllabus revision committee has considered all these factors thoroughly before venturing into the revision exercise.

The revised syllabus for BCA Programme provides a strong foundation to pursue post graduation programme in computer science / applications. The knowledge acquired by the students may also equip them to meet the industrial need, and get placed. 

The BCA programme of the MG University follows the choice based credit semester system as envisaged by the University Grants Commission and the Higher Education Council of Kerala. The Programme shall be completed in six semesters. Each semester is a minimum of 18 instructional weeks, comprising 90 working days with continuous internal evaluation and University examination at the end of each semester.



## 7.4..2. Attendance:

%age of Attendance	Grade
>90%	A
Between 85 and 90	B
Between 80 and 85	C
Between 75 and 80	D
< 75	E

7.4.3 Assignments: Best two assignments are considered per course

7.4.4. Seminar/Viva : The student has to take a minimum of 1 seminar per course.

7.4.5. Class test. A minimum of 2 class tests are to be attended. The grades of best 2 test are to be taken

7.4.6. The evaluation of all components are to be published and are to be acknowledged by the candidate. All documents of internal assessments are to be kept in the college for 2 years and shall be made available for verification by the university. The responsibility of evaluating the internal assessment is vested on the teacher(s) who teach the course.

In case a candidate fails to secure the minimum grade D in internal assessment, he/she may secure it by repeating the course altogether in a regular class or to take the course with a faculty member assigned by the Head of the Department. But such improvement in internal in the same paper cannot be attempted more than once.

The supplementary examinations will be conducted along with the next regular semester examinations.

## 8. PATTERN OF QUESTIONS

Questions shall be set to assess knowledge acquired, standard application of knowledge, application of knowledge in new situations, critical evaluation of knowledge and the ability to synthesize knowledge. The question setter shall ensure that questions covering all skills are set. He/She shall also submit a detailed scheme of evaluation along with the question paper.

A question paper shall be a judicious mix of objective type, short answer type, short essay type /problem solving type and long essay type questions.

Weight: Different types of questions shall be given different weights to quantify their range as follows:

	Type of questions	Weight	Number of questions to be answered
1	A bunch of 4 objective type questions	1	4 bunches (no choice)
2	Short answer type questions	1	5 out of 8
3	Short essay/problem solving type questions	2	4 out of 6
4	Essay type questions/Programs	4	2 out of 3

## 9. Requirement for the completion of Programme

A candidate has to complete the Programme within a period of five years after the registration.

c) A candidate who does not complete the concerned semester with the minimum attendance requirement prescribed will not be permitted to attend the next semester.

**PROPOSED SCHEME FOR BCA PROGRAMME**  
**REVISED CURRICULUM**

**REVISED CURRICULUM - 2009**

**I Semester**

Course No.	Course	No. of hours per week		Dum. of Exam in hours	Credits
		Lect	Lab.		
BCA101	English-I (Common)	5	-	3	4
BCA102	Mathematics (Complementary)	4	-	3	4
BCA103	Basic Statistics (Complementary)	4	-	3	4
BCA104	Introduction to Computers (Core)	4	-	3	4
BCA105	Methodology of Programming and programming in C (Core)	4	-	3	3
BCA106	Software Lab I (Core)	-	4	3	2
	<b>Total</b>	21	4		21

**II Semester**

Course No.	Course	No. of hours per week		Dum. of Exam in hours	Credits
		Lect	Lab.		
BCA201	English-II (Common)	5	-	3	4
BCA202	Discrete Mathematics (Complementary)	4	-	3	4
BCA203	Accounting & Programming in Cobol (Core)	3	-	3	3
BCA204	Data Structures (Core)	4	-	3	3





1. **Familiarization of Computer System and installation:** Demonstration of various units of Computer system, handling of devices, demo on hardware units, Login process, Booting Process, software installation, driver installation, printer installation etc.
2. **Practicing Operating System Commands:** MS-DOS internal & External commands (dir, copy, del, ren, copy con, date, time, chkdsk, mkdir, cd, rmdir, EDIT etc). MS-WINDOWS using start menu, desk top, task bar, word pad, note pad, file management- creation, copy, delete, moving of files in directories, selecting and executing a program - Demonstration of editing, compiling and executing a C program using a C compiler.
3. **Programs using Basic Constructs:** Fundamental data types, qualifiers- long, short, unsigned, input/output functions scanf(), printf(), Arithmetic expressions, Evaluation of integer, real and mixed mode arithmetic expressions, truncation effect, type casting, relational and logical expressions, Conditional operators, trigonometric functions- sin(), cos(), tan(), mathematical functions abs(), sqrt(), round() defined in math.h, printing formatted outputs using width specifier.
4. **Programs using control structures:** if, switch, for, while, do-while, nested structures, break and continue. Sample programs should include printing of Fibonacci numbers, prime numbers, check for Armstrong numbers, summation series exp(x), sin series etc and verification of result using built in functions, printing pyramid like pattern & other similar patterns using nested loops.
5. **Programs using Arrays:** Array based programs Creation of array containing prime numbers, matrix addition, matrix multiplication, transpose of a matrix, array sorting, preparing rank lists based on marks, searching of arrays (linear) for finding price of an item. Static initialization of arrays.
6. **String manipulation programs** reading strings using %, gets(), getchar(), copying one string into another, counting number of characters, vowels, words etc, using string handling functions.
7. **User Defined Functions:** Programs using return type functions, void type functions, example program using recursive functions, array sorting program using function with call by reference, function to copy one string into another.
8. **Program using structures:** array of structures, program using structure containing arrays and array of structures. Rank list preparation
9. **Simple program using pointers**

## SEMESTER 2

BCA 201: ENGLISH (Common)

( Syllabus as approved by Board of Studies of English ( UG)

BCA 202: MATHEMATICS( Complementary)

( Syllabus as approved by Board of Studies of Mathe Matics ( UG)

**BCA203: Accounting and Programming in COBOL (Core)**

◆ **Unit-1 :** Accounting Principles: Accounting concepts, conventions, Double Entry systems, Journal and Journalizing, Ledger- Posting and balancing, Trial balance

Unit 2 : ◆ **Final accounts:** Manufacturing account, Trading account, Profit and Loss account, Balance sheet.

Unit 3: **Introduction to COBOL:** History of COBOL, COBOL Coding sheet, Basic structure of COBOL programs, Character set, COBOL words and rules, Data names, Identifiers, Literals, Figurative constants, IDENTIFICATION DIVISION-entries, ENVIRONMENT DIVISION - CONFIGURATION SECTION, DATA DIVISION - WORKING-STORAGE SECTION - Level numbers and structure - data entries-VALUE clause, PICTURE clauses- Edited Picture clauses.

Unit 4: **PROCEDURE DIVISION :** Need for Paragraph, Input-Output Verbs DISPLAY and ACCEPT, Data Movement Verb MOVE, Arithmetic verbs- ADD, SUBTRACT, MULTIPLY, DIVIDE, COMPUTE- ROUNDED option - ON SIZE ERROR option, Operator precedence, conditional verb-IF statement, IF-ELSE statement, Nested IF statement, Conditions in IF statement- class, sign, relational, negated, compound, condition name condition, Sequence control verbs-GO TO, STOP RUN, CORRESPONDING option MOVE ◆ ADD - SUBTRACT, Table Handling- Arrays and subscripting- one, two dimensional tables, PERFORM statement - five different formats, ◆ GO TO with DEPENDING ON option. Programs based on above verbs.

Unit 5: **SEQUENTIAL FILES AND FILE PROGRAMS :** Various types of files. File program entries in various divisions- ENVIRONMENT DIVISION, INPUT-OUTPUT SECTION- DATA DIVISION- FILE SECTION entries- Level numbers, Level indicators- FD -◆ SD, FILLER clause, PROCEDURE DIVISION for sequential files- OPEN, READ, WRITE, REWRITE, CLOSE verbs, various File opening modes- INPUT, OUTPUT, EXTEND and I-O modes, Simple SORT verb, Simple MERGE verb, Detailed structure of COBOL programs, SEQUENTIAL FILE program including sorting and merging. Concept of Indexed sequential file and Random access files.

**Book of study:**

1. Financial Accounting: Balakrishnan Nair.
2. COBOL Programming: M.K Roy, D.G Dastidar, - Tata McGraw Hill Second Edition.

References:

1. Accountancy : S P Jain , K L Narang
2. Advanced Accountancy (Vol.1) : S N Maheshwari, S K Maheshwari

**BCA204 : Data Structures (Core)**

Unit 1:

◆ **Concept of Structured data:** Data structure definition, Different types and classification of data structures, Arrays representation of array in the memory, linear array operations, Bubble sort, Selection sort, linear search, binary search, sparse matrix.



- iii) Preparing a sequential file containing Salary statement using an input file containing employee pay details.
- iv) To Display the summary of total deposits and total withdrawals in a day using a bank transaction file containing date, Account no, Type of transaction (D-deposit, W-withdrawal) and Amount.
- v) Preparing Electricity Bill using a sequential file containing Consumer No, Name, Previous Reading and Current Reading. An appropriate tariff structure may be assumed.

## II. Data Structures using C. (3 hours per week)

1. Array search and sort ♦ Bubble sort, Selection sort, linear search, binary search, sparse matrix, polynomial addition.
2. Stack implementation, Application of stacks ♦ Conversion of infix expression to postfix, expression evaluation.
3. Queue implementation, Implementation of circular queue. ♦
4. Linked list- implementation, concatenation etc., circular list and doubly linked list implementation, implementation of stacks and queue using linked lists. ♦
5. Creation and traversal of binary search trees.

## SEMESTER 3

### BCA301 : ♦ Advanced Statistical Methods ( Complementary).

( Syllabus as ♦ approved by Board of Studies of Statistics ( UG) ♦)

### BCA302 : Design and Analysis of Algorithms (Core).

#### Unit I:

♦♦♦♦♦♦♦♦♦♦ Introduction ♦ Definition of Algorithm, Areas of algorithm study, performance analysis ♦ space complexity, time complexity, asymptotic notations ( $O$ ,  $\Omega$ ,  $\theta$ ).

#### Unit II:

♦♦♦♦♦♦♦♦♦♦ Divide and Conquer ♦ General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Saracen ♦s matrix multiplication.

#### Unit III:

♦♦♦♦♦♦♦♦♦♦ Greedy method ♦ General method, Knapsack problem, Job sequencing with dead lines, Minimum cost spanning trees ♦ Prim ♦s algorithm, Kruskal ♦s algorithm, Optimal merge patterns, Single source shortest path, Optimal binary search trees.

#### Unit IV: ♦

♦♦♦♦♦♦♦♦♦♦ Dynamic programming ♦ The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

#### Unit V:

♦♦♦♦♦♦♦♦♦♦ ♦ Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking ♦ General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

#### Book of study:

- ♦♦♦♦♦♦♦♦♦♦ Ellis Horowitz, Sartaj Sahni, Sanguthevan Rajasekharan
- ♦♦♦♦♦♦♦♦♦♦ Computer algorithms/C++ (Second Edition)
- ♦♦♦♦♦♦♦♦♦♦ Universities Press.

#### Reference:

1. Anany Levitin  
Introduction to design and analysis of algorithms  
Addison Wesley  
Low price edition.
2. Richard Neapolitan, Kumarss Naimipour  
Foundation of Algorithms using C++

### BCA303: ♦ Computer Organization and Architecture (Core)

#### Unit 1:

Functional units of a computer, Basic operational concepts, Bus structure, Addressing methods, Memory locations and addresses, Instructions and instruction sequencing, Instruction execution.

#### Unit 2:

Central Processing Unit, General Register Organization, Stack Organization, Instruction Formats, Instruction Classification, Addressing modes.

#### Unit 3:

Main Memory, Organization of RAM, SRAM, DRAM,, Read Only Memory-ROM,PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

#### Unit 4:

Parallel Computer Structures: Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

#### Unit 5:

Pipelining and Vector processing, Introduction to pipelining, Instruction and Arithmetic pipelines(design) Vector processing, Array Processors.

#### Book of study :

- M.M Mano-Computer Systems Architecture
- Kai Hwang and F A Briggs-Computer Architecture and parallel processing



**Reference**

Hamachar-Computer Organization

**BCA304: Computer Graphics (Core)****Unit 1:**

**Practical applications of Computer Graphics:** Display devices, Raster Scan Display, DVST, Flat panel, LCD, Raster Scan systems, Random Scan systems. Input devices, Hard copy devices, Graphics software.

**Unit 2:**

◆ **Points and lines:** Line drawing algorithms, Simple DDA. Circle generation, Mid point circle algorithm, Character generation.

**Unit 3:**

**2D Transformations:** Translation, Rotation, Scaling ◆ Matrix representation and homogenous coordinates, composite transformation, raster methods for transformations. **Two-dimensional viewing:** viewing pipeline, concept of window and view port, window to viewport transformation. Clipping operations ◆ point clipping, line clipping, Cohen Sutherland line clipping, polygon clipping, Sutherland-Hodgeman polygon clipping.

**Unit 4:**

**Structure Concepts:** Basic structure functions, setting structure attributes, ◆ Editing structures. **Graphical User interface and interactive input methods:** Input of graphical data, interactive picture construction techniques.

**Unit 5:**

**Three-dimensional concepts:** Three dimensional display methods, three dimensional graphics packages. **Three dimensional object representations:** Polygon surfaces, sweep representations, constructive solid geometry methods, octrees and quad trees.

**Book of study :**

Hearn D & Baker MP, ◆ Computer Graphics ◆, PHI pvt Ltd

**References**

1. Newman W M & R F Sproul, ◆ Principles of Interactive Computer Graphics ◆, Mc-Graw Hill Book Company.
2. Plastock R & Xiang Z, ◆ Theory and problems of computer Graphics ◆, Schaum Series, McGraw Hill bok Company.

**BCA305 :Object Oriented Programming and ◆◆ C++ (Core)****Unit 1:**

**Introduction-** Object Orientation- object oriented development-Object oriented Methodology-Object oriented Models-Object oriented themes-Modeling-Objects and classes concepts-Links and association concepts-Generalization and Inheritance-state modeling-interaction modeling

**Unit 2:**

**Object Oriented language C++:** Basic concept of object oriented programming -benefits of oops-Structure of C++ Program-Basic, derived and user defined data types-Symbolic constants-operators in C++ - Control Structures -Functions in C++-The main function, function prototyping-call by reference-return by reference- inline function-function overloading- friend and virtual functions,

**Unit 3:**

**classes and objects-**specifying a class - Defining member functions - Nesting of member functions - Private member functions - arrays within a class - static data members - static member functions - Arrays of objects-objects as function arguments

**Unit 4: ◆Constructors and Destructors-** Constructors- Parameterized Constructors-Multiple constructors - Copy constructor - Dynamic constructor-Destructors - Operator overloading & Type conversions.

**Inheritance-**Defining derived classes-Single, Multiple, Multilevel, Hierarchical◆◆ and hybrid inheritance- private, public, protected inheritance-virtual base classes- Abstract classes- Constructors in derived classes- nesting of classes.

**Unit 5: ◆Pointers-Virtual functions and polymorphism-**Pointers-Pointers to objects-this pointer-pointer to derived classes-virtual functions-Pure virtual functions-C++ streams-Stream classes-Unformatted and Formatted console I/O operations- Managing output with manipulators. Manipulating strings.

**Book of study :**

◆◆◆◆◆◆◆◆◆◆ Object Oriented Modeling and Design with UML, Second Edition

◆◆◆◆◆◆◆◆◆◆ By James Rumbaugh, Michael Blaha

◆◆◆◆◆◆◆◆◆◆ Object oriented Programming with C++, Fourth edition By E. Balaguruswamy

**References:**

- ◆◆ Let Us C++ ,Yashwant Kanetkar, Bpb Publications
- ◆◆ John R Hubbard, Programming with C++, Shaum◆s Outline series.
- ◆◆ Objected-Oriented Programming in C++ , Rajesh K Shukla, Wiley India.2008 Edition
- ◆◆ Venugopal, Rajkumar, Ravishankar, *Mastering C++*, Mc Graw Hill

**BCA306 :◆ Software Lab III (Core)**

[There will be two questions one◆ from 1 to 4 and second◆ from 5 to 8]

1. Programs based on class, objects and manipulation of objects using member functions
2. Programs based on friend functions, passing objects as arguments to function.
3. Programs based on array of objects.
4. Programs based on function overloading, Default arguments.
5. Programs based on operator overloading (binary, unary) using member functions and friend functions.
6. Programs based on constructors, different types of constructors- copy constructor, default constructor.





**Book of study :**

Peter Norton's Guide to Visual Basic 6 by Peter Norton and Michael Groh, Techmedia Publications -Chapters:

**References:**

1. Visual Basic 6 from the Ground Up by Gary Cornell, Tata McGraw-Hill
2. Using Visual Basic 6 by Bob Roselman, Richard Peasley and Wayne Prunchiah, PHI

**BCA406: Software Lab IV (Core)**

[There will be two questions, the first one from Group I and second from Group II]

**SQL Commands (2 hours)**

1. **Data definition commands** - CREATE, ALTER, DROP, Adding Constraints ♦ Primary key, foreign key, unique key, check, not null.
2. **Basic SQL queries** ♦ INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of ♦ rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.
3. **Complex Queries** ♦ Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.
4. **Managing views, Simple stored procedures.**
5. **Data Control commands** - Access Control and Privilege commands.

**Visual Basic (4 hours)**

6. Designing User Interface using- List Box, Combo Box, Image and Picture Box, Directory-File-Drive list boxes, Rich text box, etc

7. Creating Menus- Creating Menus and writing Codes, Linking Menus with SDI forms, Creating toolbox and access it for loading and working forms.

8. Database Connectivity using Controls - Designing user interface with forms and controls and create database connectivity by DAO and ADO Control.

9. Database connectivity using Object models - Creating Database connectivity by DAO Object model and Connectivity Using ADO Object model by OLE DB as well as ADODC Connectivity.

10. Creating Reports - Create reports using Data Report in VB and also using Crystal report.

11. Package and deployment Wizard - Package, Deploy and Scripting

**SEMESTER 5****BCA501 : COMPUTER NETWORKS****UNIT -1:**

Need of network. Network classifications-LAN, MAN , WAN, wireless networks & Internet. Data and signals-analog and digital, ♦ periodic analog signals, digital signals, bit rate, baud rate, bandwidth ♦ Transmission impairments- attenuation distortion and noise. ♦ Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

**UNIT-2**

Bandwidth utilization Multiplexing: ♦ FDM, TDM, spread spectrum. Transmission Media- guided media and unguided media. Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

**UNIT-3**

Hop to Hop Delivery. Error Detection and Correction ♦Type of Errors, Redundancy, Detection ,Correction, Forward Error and Retransmission. Coding -Block Coding(Parity Chck Code and Hamming Code) and Cyclic Codes. ♦ Framing, flow and error control, Protocols - Noiseless channels (Simplest , Stop and Wait) and Noisy channels(Stop and Wait and Piggy Backing) .

**UNIT-4**

♦Multiple Access Protocols . ♦ Random Access-ALOHA, CSMA. Wired ♦ LANs-IEEE standards, standard Ethernet, wireless LANs-Bluetooth, Wireless Lan- Cellular Telephony-Frequency Reuse Principle ,Transmitting, Receiving, Handoff, Hard Hand off, Soft Hand off, Roaming . ♦ Cellular Telephony Generations ♦First, Second and Third generations. Satellite Networks ♦Geo, Meo, ♦ Leo.

**UNIT-5**

Host- To-Host ♦ Communication . Network Level Logical addressing-IPv4 addresses, IPv6 addresses, Internet protocol-IPv4 andIPv6, ♦ Process to Process ♦ Delivery ♦Connectionless and Connection Oriented Service : UDP, TCP. Congestion control, quality of service. Client Server Programs. ♦Name space, domain name space, Remote logging, Electronic mail, file transfer.

**Book of study :** Data communication and Networking (fourth edition)-B. A. Forouzan

### **BCA 502 : Operating Systems**

#### **Unit 1:**

**Introduction:** OS Definition, Functions, OS as a resource manager, types of OS Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

#### **Unit 2:**

**Process:** Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

#### **Unit 3:**

**Process Coordination :** Synchronization - The Critical Section problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors. Dead Locks : System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead Lock Detection, Recovery from Dead Lock.

#### **Unit 4:**

**Memory Management:** Memory Management Strategies -Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement

#### **Unit 5:**

**Storage Management :-**File System :- File Concept, Access Methods, Directory Structure, protection , Implementing File Systems :-File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

### **Book of study :**

Operating System Principles, Seventh Edition, Abraham Silberschatz, Peter Galvin and Greg Gagne, John Wiley  
Operating Systems- By William Stallings

#### **Reference:**

Operating Systems- By Milan Kovic (TMH )

### **BCA 503: Java Programming**

#### **Unit 1:**

Object oriented programming-Encapsulation-Inheritance-Polymorphism-Genesis of Java-characteristics of java- program structure-identifiers-operators-variables-literals-data types-Arrays. Control Statements-selection statements-iterative statements-jump statements - Loops- while loop-do while loop- for loop



#### **Unit 2:**

Classes-declaration object references-instantiation- method declaration-method calling this operator- constructor- method overloading-constructor overloading-method overriding-inheritance-super class-dynamic method dispatch-final-static-abstract classes String Handling.

#### **Unit 3:**

Packages - creating packages-using packages-Interfaces-Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface- thread priorities.

#### **Unit 4:**

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- AWT: Frame Class-AWT Controls: Label-Button-Checkbox-List-Choice control-Text Field-Text Area- Lay out Managers.

#### **Unit 5**

Applet Fundamentals -applet tag-applet life cycle-passing parameters to applets- working with graphics Line-Rectangle-Oval Arc- color setting-I/O Streams: DataInputStream-DataOutputStream-BufferedReader-BufferedWriter classes

### **Book of study :**

Java2 The Complete Reference Seventh Edition: Patrick Naughton

#### **Reference:**

1. Programming with java E. Balagurusamy
2. Core Java Volume 1- Fundamentals eighth edition Cay S Horstmann & Gary Cornell
3. Java 6 Programming Black Book 2007 Edition Dreamtech press-

### **BCA504: OPEN COURSE**

### **BCA505: Software Lab V**

Part I

Applet Programs : Graphics- AWT controls- Event Handling

Part II (using class and read inputs from keyboard)

Java Programs: MethodOverloading- MethodOverriding-inheritance-abstract class interfaces- packages-Exception Handling-Multithreading.

### **BCA506: SOFTWARE DEVELOPMENT LAB I (Mini Project)**

Mini project shall be a small complete project, to make the student confident in designing a system based on *System Analysis & Design*

course, using VB and SQL Server/ ORACLE..

## **SEMESTER 6**

### **BCA601: WEB TECHNOLOGY**

**UNIT I:** INTERNET- Basics of internet- Addresses & names for the internet, Web objects & site , E-mail, WWW, File transfer, The TELNET , The USENET , Gopher, Wais, Archie, Veronica, Internet chat, Web server, Proxy server, Fast ready connections to the Web, Web Browser.

**UNIT II :** HTML, Basic HTML, Document Body Text, Hyperlink, Adding more formatting, LISTS- Using Colour & images- Tables, Multimedia objects, Frames, forms- MARQUEE.

**UNIT III:** DHTML, Cascading ,style sheets, Introduction using styles, Working simple examples, Defining your own styles, Properties & values in styles , Style sheets A worked example , Formatting blocks of information

**UNIT IV:** Java script Introduction to Java script Basics Variables String manipulation Mathematical Functions Operations Arrays Functions Objects in Java script- regular expressions Built- in objects Data validation Messages & Confirmation Status bar- Writing to a different frame.

**UNIT V:** PHP Introduction to PHP , Including PHP in a page , Datatypes , Program Control, Arrays , User defined functions, Built-in Functions , Regular expressions Using files

#### **Book of study :**

1. Internet & Web Technologies, Raj Kamal, Tata Mc Graw Hill
2. Web Programming, Chris Bates, 3<sup>rd</sup> Edition; Pub: John Wiley & Sons

**Reference** 1.HTML Black Book, Steven Holzner, Dreamtech Publishers

### **BCA602: Software Engineering**

**Unit I:** Introduction to Software Engineering Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices.

Software life cycle models Definition, Waterfall model, Increment process models, Evolutionary process models, Selection of a life cycle model.

(Chapter 1 and 2)

**Unit II:** Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation, Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO)

(Chapter 3 and 4)

**Unit III:** Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software quality model, Capability Maturity Model

(Chapter 5 and 7)

**Unit IV:** Software Testing ♦ What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing ♦ path testing, Graph matrices, Data flow testing; Levels of testing ♦ Unit testing, integration testing, system testing, validation testing, a brief introduction about debugging and various testing tools.

(Chapter 8)

**Book of Study:**

K K Aggarwal, Yogesh Singh  
Software Engineering (Third Edition)  
New Age International Publications

**Reference:**

1. Ian Sommerville  
Software Engineering VII th Edition Pearson Education
2. Pankaj Jalote  
An Integrated approach to Software Engineering  
Narosa Publishing Company, Second Edition.  
Pearson Education

**BCA603(A): Client Server Computing****Unit 1**

Overview of C/S Computing: Definition, Benefits & Evolution, Hardware & Software, Trends, Evolution of operating systems, networking trends.  
Overview of C/S applications: components, classes, categories.  
Overview of C/S computing: Dispelling the Myths, Obstacles- Upfront and hidden, open systems and standards, Standards setting organizations, factors of success.

**Unit 2**

Client hardware and software: Client components and operating systems. What is GUI?, Xwindow vs. windowing, database access.  
Application logic client software products: GUI environments, converting 3270/5250 screens, database access tools.  
Client requirements: GUI design standards, Open GUI standards, Interface dependents, testing interfaces, development aides.

**Unit 3**

Server hardware: Benchmarks, categories of servers, features and classes of server machines.  
Server Environment: eight layers of software ♦s, network management and computing environments, extensions, network operating systems, loadable modules.  
Server operating systems: OS/2, Windows new technology, UNIX based operating systems.

**Unit 4**

Server Requirements : Platform independence, transaction processing, connectivity, intelligent database, stored procedures, Triggers, Load Leveling, Optimizer, testing and diagnostics tools, real ability backup and recovery mechanisms.  
Server data management and access tools: Data manager features, data management software, database gateways. LAN hardware and software, Network Operating Systems.

**Text**

1. Dawna Travis Dewire , Client Server Computing, McGraw Hill International

**References**

1. Tanenbaum and Van Steen, Distributed Systems ♦ Principles and Paradigams,  
Pearson Education, 2005
2. Orfali, Harkey and Edwards, The Essential Client server Survival guide, 2<sup>nd</sup> edition  
Galgotia, 2003
3. Jeffrey.D.Schan, C/S Application and Architecture, Novell Press, BPB
4. Joe Salami, Guide to C/S Databases, Bpb Publ., 1994
5. David Vaskevitch , Client Server Strategies, Galgotia, 1994.

**BCA603(B): Linux Operating System****Unit 1:**

**Linux introduction and file system** - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell - Linux File system - Boot block, Super block, Inode table, Data blocks, Linux standard directories. Commands for files and directories ♦ cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces.

**Unit 2:**

**Essential Linux commands**, Understanding shells, Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, scheduling of processes. Batch commands, kill, ps, who, ♦ Printing commands, find, sort, touch, file, file processing commands - wc, cut, paste etc - mathematical commands - expr, factor etc. Creating and editing files with vi ♦ editor

**Unit 3:**

**System administration** - Common administrative tasks, identifying administrative files ♦ configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of user ♦s accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command

**Unit 4:**

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit 5: Simple filter commands ♦ pr, head, tail, cut, sort, uniq, tr - Filter using regular expression ♦ grep, egrep, sed ♦ Understanding various Servers ♦ DHCP, DNS, Squid, Apache, Telnet, FTP, Samba.

Book of study :

- 1. ♦♦ Red Hat Linux Bible ♦ by Cristopher Negus, Wiley Dreamtech India
2. ♦ UNIX Shell Programming ♦ by Yeswant Kanethkar, BPP

References ♦:

- 1. ♦ Official Red Hat Linux User's guide ♦ by Redhat, Wiley Dreamtech India
2. ♦ UNIX for programmers and users ♦ by Graham Glass & King Ables, Pearson Education
3. ♦ Beginning Linux Programming ♦ by Neil Mathew & Richard Stones, Wiley Dreamtech India

BCA603(C) : DATA MINING

Unit I: Introduction ♦ Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities ♦ Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

(Chapter 1)

Unit II: Data Warehouse and OLAP technology ♦ Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining.

(Chapter 2, 3)

Unit III: Association Rules and Classification Concepts ♦ Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction.

(Chapter 5, 6)

Unit IV: Cluster Analysis ♦ Definition, Types of data in cluster analysis, A categorization major Clustering methods- ♦ Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, ♦ Hierarchical methods, ♦ Density based methods.

(Chapter 7)

Unit V: Mining Complex Data ♦ Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

(Chapter 10)

Book of study:

Jiawei Han and Micheline Kamber
Data Mining - Concepts and Techniques (Second Edition)
Elsevier, 2006

Reference:

- 1. Witten and Frank
Data Mining ♦ Practical Machine Learning Tools and Techniques (Second Edition)
Elsevier, 2005
2. Soman, Divakar and Ajay
Data Mining ♦ Theory and Practice
PHI, 2006

BCA603(D) ♦♦♦ System Software

Unit I:

System software and application software-general concepts. Language processing concepts: Introduction, Language Processing activities, Fundamentals of Language Processing, Fundamentals of Language specification. Phases of language processor.

Unit II

Assembly Language statements- imperative, declarative, assembler directive, Elements of assembly language programming- forward reference problem, design of two pass assemblers and single pass. Marcos: ♦ Macro Definition, macro call, macro features. ♦

Unit III

Compilers: ♦ Aspects of compilation, Phases of compiler, syntactic structure of language, Grammars-classification, Scanning, Parsing techniques- representation of parse tree-intermediate code generation-loop optimization.

Unit IV

Linkers and Loaders : Various types of loaders ♦ linking and relocation concepts.

Book of study :

- 1. Principles of Compiler Design by Aho and Ullman



◆2. Systems programming and Operating Systems by D.M. Dhamdhare, Second

Revised Edition, published by Tata McGraw ◆ Hill

**Reference:**

1. Introduction to System Programming , Leland L. Beck -3<sup>rd</sup> Edition-Pearson Education

**BCA 604 Seminar**

◆◆◆◆◆◆◆◆◆◆ The student shall choose a modern topic of current day interest in the areas of Computer Science / Information Technology and present a seminar using appropriate presentation media such as LCD projector, OHP etc. A seminar report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) shall be submitted.

**BCA 605: SOFTWARE DEVELOPMENT LAB II ( Main Project)**

The project topic shall be chosen from areas of current day interest using latest packages/ languages running on appropriate platforms, so that the student can be trained to meet the requirements of the Industry. A project report shall be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals