SOPHIA GIRLS' COLLEGE, (AUTONOMOUS) AJMER

Scheme of Examination And SYLLABUS

2017-18 (Batch)

FOR

BACHELOR IN COMPUTER APPLICATION

Semester – I to VI

BACHELOR IN COMPUTER APPLICATIONS

Eligibility for admission in First Year of BCA is 10+2 examination of any board with at least 50% marks. As regards admission on reserved category seats government rules will be applicable.

SCHEME OF EXAMINATION

The number of paper and the maximum marks for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/paper, wherever prescribed, separately.

Classification of successful candidates shall be as follows:

First Division   60%   ⎤   of the aggregate marks prescribed at Part I

                           ⎬   Examination, Part II Examination, Part III

Second Division   50%   ⎦   Examination, taken together

All the rest shall be declared to have passed the examination.

- ⚑ For passing a candidate shall have to secure at least 40% marks in each course (Theory and practical separately).
- ⚑ No division shall be awarded at the Part I and Part II examination.
- ⚑ Due paper(s) will be applicable if a candidate fails in not more than three (3) papers (theory,). Due paper(s) will be held along with the examination of the next semester. The chance of due paper(s) will be given only 4 times.
- ⚑ Whenever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.

Examination Pattern

Maximum Marks : 50   **Duration : 2 ½ Hrs.**

Section A   10 * 1 =10 marks

Contains 10 Questions of 1 mark each & all are compulsory to do.

Three questions from each unit (but 4 questions from one unit) 3 + 3 + 4 = 10 Questions

Section B   3+3+4 = 10 marks

Contains 3 questions with internal choice (Two questions from each unit).

(2 Questions of 3 marks & 1 Question of 4 marks)

Student has to do 3 questions and at least one question from each unit.

Section C   3 * 10 = 30 marks

Contains 3 questions with internal choice (Two questions from each unit).

Each Question carries 10 marks.

Student has to do 3 questions and at least one question from each unit.

Note:

1. A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
2. One internal and one external examiner shall conduct two practical exams, in a day, of a batch of 60 students.
3. Duration of practical exam is 3 hours.
4. Practical of 40 marks distribution is as under:
   a. 20 marks for practical examination exercise for 4 questions.
   b. 10 marks for Viva-voce
   c. 10 marks for Laboratory Exercise File.

Course Structure in Semester - I

Paper Code	Theory Papers	CIA	ESE	Max. Marks	Min. Marks	Duration
	Semester - I					
BCA – 101	Computer Fundamentals – I	25	50	75	30	2 ½ Hr.
BCA – 102	Management and Accounting – I	25	50	75	30	2 ½ Hr.
BCA – 103	Communication Skills	25	50	75	30	2 ½ Hr.
BCA – 104	PC Software – I	25	50	75	30	2 ½ Hr.
BCA – 105	Fundamentals of 'C' Programming – I	25	50	75	30	2 ½ Hr.
BCA – 106	Multimedia Basic – I	25	50	75	30	2 ½ Hr.
	Practical Papers					
BCA – 107	PC Software - Laboratory	10	40	50	20	3 Hr.
BCA – 108	'C' Programming – Laboratory	10	40	50	20	3 Hr.
BCA – 109	Multimedia - Laboratory	10	40	50	20	3 Hr.
	Total			600	240	

BCA – 101 Computer Fundamentals - I

Max. Marks : 75

Min. Marks: 30
Duration : 2 ½ Hrs.

Objectives:
1. Describe the computer system and identify its types.
2. Illustrate the use of different input devices.
3. Categorize different output devices on the basis on operation.
4. Summarize the different aspects of data processing.

Unit - I

Introduction to Computer: Definition, Diagram, Characteristics, Classification of Computers: Analog Computers, Digital Computers, Hybrid Computers, Classifications of computer on the basis of size and speed, different type of computers, Generation of computers. Applications of Computer: Desktop publishing, design and manufacturing, military, robotics, planning and management, marketing, communications, education.

Unit – II

Input Devices: keyboard, mouse, track ball, touch pad, joystick, touch sensitive screens, pen based systems, digitizer, data scanning devices, optical recognition systems, bar code readers, optical mark readers, Optical character reader, optical scanners: drum scanners, hand scanner, flatbed scanner, web camera, game pad, digital camera.

Unit - III

Output Devices: Hard copy devices: Printer (impact printers) daisy wheel, dot matrix printer, line printer, chain printers, comb printers, (non-impact printers) DeskJet, inkjet, laser printer, thermal transfer printer, barcode printers.

Reference Books:
- Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.

- Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi.
- Fundamentals Of Information Technology, 2E , Alexis Leon & Mathews Leon,Vikas Publishing

BCA – 102 Management and Accounting - I

Max. Marks : 75   **Min. Marks: 30**
                                                       Duration : 2 ½ Hrs.

Objectives:
1. Describe about the concept and functions of management
2. Develop and understanding of motivation theories, communication process and social responsibilities
3. Anticipate concepts of organizational cultures, team and group dynamics and Summarize the different aspects of management and organizational behavior

Unit – I

Introduction to Management Meaning, Definition, Nature, Characteristics, Principles (Fayol's), Functions, skills of a manager. Overview of Management functions, Planning : meaning, features, process, advantages & disadvantages, types of plans, Leadership (Meaning, Importance, Nature, Styles (Motivational, Power Centered, Supervisory Style),Qualities of a Successful Leader.

Unit - II

Motivation: meaning, nature, importance, Theories of motivation: Maslaw's need hierarchy, Herzberg's two factor, MC Gregor's theory. Communication: Process, barriers to communication, role of electronic media and information technology in communication, social and environmental responsibility.

Unit - III

Organizational culture, individual perception, values, Concepts and Importance, Attitudes: Meaning, nature, formation of attitude, ways of changing, team and group dynamics, specification

Reference Books :
- Management – G.S. Sudha RBSA Publication
- Philip, Marketing Management 9th Edition- Kotler, PHI
- Financial Management- Principle and Practice- 6th Revised Edition – S. N. Maheshwari, S. Chand & Sons
- Organizational Behaviour 8th Edition-Robbins, P. Stephen, PHI

BCA – 103   Communication Skills

Max. Marks : 75   **Min. Marks: 30**
                                                       Duration : 2 ½ Hrs.

Objectives:
1. Understand the importance of the different types of communication
2. Develop their writing skills
3. Use their communication and writing skills in organizational structure

Unit - I

Communication—Definition, Types of Communications – oral and written communication; formal and informal Communication; Upward and Downward Communication; One way and Two way Communication. Process of Communication. Barriers in Communication.

Unit – II

Business letters – Types and Writing of Business Letters (Sales and Purchase, Complaint and Suggestion, Promotional and Advertising).
Applying for a job- Resume, Curriculum Vitae and Application Writing.

Unit - III

Report writing – definition and types of report, sections of a report, determining the purpose of reports, planning for the report and collecting information, developing an outline, final writing of the report. Drafting circulars, notices, agenda and minutes of meetings.
Reference Books:

- Communication Skills –Richard S ,Hazelden
- Effective Technical Communication –M Ashraf RizviTata Mcgraw Hill
- Business Communication- K.K. Sinha, Jain book Depot
- Communication Skills for Technical Students -T. M. Farhatullah, Orient Blackswan

BCA – 104 PC Software – I

Max. Marks : 75   **Min. Marks: 30**
           Duration : 2 ½ Hrs.

Objectives:
1. Understand the difference between an operating system and an application program, and what each is used for in a computer
2. Study different tools of Microsoft Word by hands on practice
3. Design effective presentation by implementing different formatting styles.

UNIT-I

Software: System software, application software, utility software.
User Interface: Introduction to CUI and GUI and Comparison .
MS Windows, Features of Windows, Desktop (My Computer, My Document, Recycle Bin, Network Places, Internet Explorer. Windows Explorer, Start Menu and Task bar.
System Tool:, Disk defragmentation, System Information, System Back up & Restore.
Control Panel : Add & Remove Hardware / Software, Date & Time, Personalization , Font, Mouse, Keyboard, Printer & Faxes, Sound, User Account, Windows Task Manager, Power option, Folder Option.

UNIT-II

MS-Word: Introduction to MS-Word, Features, Application Areas and its uses, types of views, Creating & Saving : New Document, copy, cut, paste, paste special, clipboard, undo, redo, Fonts, Paragraphs: Indentation and Spacing, Columns & Breaks, Styles, Find, Replace & Goto. Inserting Tables, Picture, ClipArt, Shapes, Smart Art and Charts, Symbols and Equations, Hyperlink, Bookmark. Header & Footer. Drop Cap, Textbox, WordArt, Date and Time. Table of contents, Footnotes and Endnotes, Page background. Mail merge, Macros, Auto correct and Auto Text. Comments, Ruler, Page Setup, Size, Margins, Gutter, Orientation.

UNIT-III

MS-PowerPoint: Introduction to PowerPoint, Features, Application Areas and its uses, Creating Presentations through Blank Presentations, Templates, Slide Master, Views of PowerPoint, Formatting of Presentations : Inserting Graphics and Animations, Formatting & Customizing Presentations : Slide Transactions, Custom Animation, Inserting sounds and movies, Set up and Custom Slide Shows. Handouts.

Reference Books:
- Microsoft Office 2007 – Joyce Cox & Joan Preppernau – PHI Publication
- Working in Microsoft Office- Ron Mans Field, TMH
- Absolute Beginners Guide To Computer Basics 4th Edition, Michael miller, Pearson
- PC- Software- Dr. Neeraj Bhargava , University Book House

BCA – 105 Fundamentals of 'C' Programming – I

Max. Marks : 75   **Min. Marks: 30**
           Duration : 2 ½ Hrs.

Objectives:
1. Understand basic concepts of programming language
2. Choose the loops and decision making statements to solve the problem
3. Implement different operations on array

Unit - I

Introduction to Language & its Types, Compilation and Execution. 'C' Language: Character Set, Tokens- Keywords, Variables, Constants, Operators, Expressions.

DataTypes, Type Conversion, Input Output Instructions (printf, scanf, getch, getchar, gets, putch, putchar, puts).

Arithmetic Instructions: Hierarchy, Priority and Associativity of Operators.

Unit – II

Control Instructions:

Decision Control (Statements and blocks- if, if-else, conditional operator) nesting.

Loop Control (Statements and blocks- while, for, do-while, Nesting Loops),

Case Control- (Statements and blocks- switch-case,), break, continue, goto statements

Unit - III

Arrays:- Concept of Arrays, One dimensional array & Two dimensional array, Storage strategy, Array Initialization, Memory Map of One Dimensional & Two dimensional Array, Operations on Arrays, Sorting – Selection Sort, Bubble Sort & Insertion Sort

Reference Books:
- Let Us 'C' -Yashavant P Kanetkar, BPB Publications
- Programming in Ansi 'C' – Balaguruswami – TMH.
- 'C' Programmiung Language – Kernighan & Ritchie - PHI
- 'C' How to Program – Dietel & Dietel - PHI
- 'C' Programmiung - Dr. Neeraj Bhargava & Dr. Ritu Bhargava, AlkaPublicationas

BCA – 106 Multimedia Basics - I

Max. Marks : 75   **Min. Marks: 30**
                                                                       Duration : 2 ½ Hrs.

Objectives:
1. Identify terminology associated with the concepts, techniques, and processes used throughout the multimedia environment.
2. Identify components of webpage
3. Understand key concepts of CSS and Construct a basic webpage in HTML

Unit – I

Introduction to Multimedia Technology – Application areas of Multimedia, Advantages and disadvantages of Multimedia, System components, user interface and its types, importance and features of user interface Multimedia platform, MM hardware & software requirements .

Unit – II

Introduction to HTML, Uses of HTML, Web browsers for HTML, Editing HTML : common tags, headers, text styles, formatting text, horizontal rules and more line breaks, Organize information using lists (ordered, unordered, nested & definition) , connect to a variety of resources by using hypertext links (internal and external) and tables for page layout and its attributes.

Unit – III

Create style sheets to format the look and feel of the pages, Different approaches to style sheets, understand key image theory concepts and optimize image sizes, Image map.

Frames: Placing content in frames with the tag, Targeting named frame

Form designing in HTML: Creating Forms, The <FORM> tag, Named Input fields, The <INPUT> tag, Multiple lines text windows, Drop down and list boxes, Hidden, Text, Text Area, number, Password, File Upload, Button, Submit, Reset, Radio, Checkbox, Select, Option.

Reference Books:
- Fundamental of Multimedia, Dr. Neeraj Bhargava & Dr. Ritu Bhargava, AlkaPublicationas
- Fundamental of multimedia "Drew, Feurun, 2004.
- HTML Complete: BPB Publisher.
- HTML and CSS: the Complete Suggested, Fifth Edition powell TMH

Course Structure in Semester – II

Paper Code	Theory Papers	CIA	ESE	Max. Marks	Min. Marks	Duration
BCA – 201	Computer Fundamentals – II	25	50	75	30	2 ½ Hr.
BCA – 202	Management and Accounting – II	25	50	75	30	2 ½ Hr.
BCA – 203	Data Structure & Algorithm – I	25	50	75	30	2 ½ Hr.
BCA – 204	PC Software – II	25	50	75	30	2 ½ Hr.
BCA – 205	Fundamentals of 'C' Programming – II	25	50	75	30	2 ½ Hr.
BCA – 206	Multimedia Basic – II	25	50	75	30	2 ½ Hr.
	Practical Papers					
BCA – 207	PC Software - Laboratory	10	40	50	20	3 Hr.
BCA – 208	'C' Programming – Laboratory	10	40	50	20	3 Hr.
BCA – 209	Multimedia & DSA – Laboratory	10	40	50	20	3 Hr.
	Total			**600**	**240**	

BCA – 201 Computer Fundamentals - II

Max. Marks : 75   **Min. Marks: 30**
                                                                                                      Duration : 2 ½ Hrs.

Objectives:
1. Identify computer memory according to its accessibility and hardware
2. Convert values in different number systems
3. Generalize the software according to their uses
4. Manage different aspects of Internet & defend the system against computer viruses

Unit – I

Introduction to memory, classifications, random-access memory, volatile memory, non-volatile memory, flash memory, read-only memory, secondary memory, the cache memory, auxiliary storage memory, memory hierarchy, storage device, magnetic tape, magnetic disk, floppy disk, hard disks, CD, DVD

Unit – II

Number system: binary, octal, hexadecimal, addition, subtraction, multiplications. Computer code: BCD, ASCII, EBCDIC code, logic gates and Boolean algebra representation.
Software: System software, application software, utility software

Unit – III

Computer Viruses: Introduction, history, types of computer viruses, classification of viruses, symptoms of a computer virus, & ways to catch a computer virus.
Introduction of Internet, world wide web, how the web works, web standards, website, overview, types of websites, electronic mail, e-mail header, messages and mailboxes

Reference Books:
- Computer Fundamentals-Pradeep K. Sinha, Priti Sinha, BPB Publications.
- Fundamental of Computers-V Rajaraman, Prentice Hall India,New Delhi.

- Computer Fundamentals: Architecture and Organization- B.Ram New Age Publications

BCA – 202 Management and Accounting - II

Max. Marks : 75   **Min. Marks: 30**
                                                                Duration : 2 ½ Hrs.

Objectives:
1. Enumerate the basic concepts of accounting
2. Formulate the final accounts
3. Analyze the financial statements
4. Summarize the accounting procedure

Unit I
Accounting: Definition, concepts, standards, basic accounting, entries, ledger, triple column cash book

Unit II
Understanding of final accounts:- Trading, P&CAL Balance sheet with Adjustment entries, Capital and Revenue. Automatic Accounting processes.

Unit III
Financial statements, ratio analysis
Cost accounting – CVP analysis, BEP and P/V graph
Budgeting: Meaning of budgeting, flexible and fixed budgets.

Reference Books:
- An Introduction to Accountancy 5th Edition- S. N Maheshwari and S. K. Maheshwari, Vikas Publication House
- Accounting Principles- R.H. Anthony & J.S.Roece, Homewood
- Advanced Financial Accounting- R.L. Gupta,Sultan Chand & Company

BCA – 203   Data Structure and Algorithms - I

Max. Marks : 75   **Min. Marks: 30**
                                                                Duration : 2 ½ Hrs.

Objectives:
1. Explain fundamental concepts of data structure and array operations
2. Apply appropriate searching and sorting techniques on given data structure
3. Design linear data structure by using link list and its operations

Unit I
Fundamental Notations: Data Structures and its Types: Primitive and Composite Data Types , Arrays:- Concept of Arrays, Single dimensional array, Two dimensional array storage strategy of multidimensional arrays, Index Formula for single and multidimensional Array.

Unit II
Operations on Arrays with Algorithms (Insertion, deletion), Advantages and disadvantages.
Sorting and Searching :-Introduction, Search algorithm (Linear and Binary), Concept of sorting, Sorting algorithms (Bubble Sort, Insertion Sort, Selection Sort).

Unit III
 Linked Lists:- Introduction to linked list and double linked list, Representation of linked lists in Memory, Traversing a linked list, Searching linked list, Insertion and deletion into linked list, Doubly linked lists, Traversing a doubly linked lists.

Reference Books

- Data Structures & Algorithms through 'C' - Hariom Pancholi – Genius Publications
- Data Structures and algorithms in C++- Adam Drozdex, Vikas Publications
- Expert Data Structures with 'C' – R.B.Patel - Khanna Book Publications

- An introduction to data structures with applications -Jean-Paul , P.G. Sorenson, TMH
- Data Structures in C/C++ - Tanenbaum, PHI

BCA – 204 PC Software - II

Max. Marks : 75   **Min. Marks: 30**
                                                                                                                Duration : 2 ½ Hrs.

Objectives:
1. Develop charts and validation on the data
2. Apply functions on the excel sheet
3. Create and manage database

Unit I
MS-Excel: Introduction, Features, Application Areas and its uses, views and its types, formatting and its types, **Charts**: Line, bar, column, area, pie. Pivot Tables, Data management (Sort, filters, Validation, consolidation, Text to column), auditing and tracing.

Unit II
Functions and Formulas -Text: char, concatenate exact, find, left, right, mid, lower, upper, proper, search ,substitute, trim. **Logical:** and, or, not **Math and trig:** abs, int, even, odd, fact, mod, pi, power, product, round, roman, sign, sqrt, trim. **Statistical:** Average, count, Protecting sheet and workbook.

Unit III
MS-Access: Introduction, application areas and its uses, concepts of databases, datatypes, creating a database and tables, Records Insertion, creating and customizing a form, creating and customizing reports, queries and its types(Select, Update, Delete)

Reference Books:
- Microsoft Office 2007 – Joyce Cox & Joan Preppernau – PHI Publication
- Introduction to computers 6th Edition,- Peter Norton, TMH
- Understanding computers today and tomorrow-Deborah Morley & Parker, Thomson
- Users Suggested Manuals of Ms Access

BCA – 205 Fundamentals of 'C' Programming – II

Max. Marks : 75   **Min. Marks: 30**
                                                                                                                Duration : 2 ½ Hrs.

Objectives:
1. Use functions to solve the given problem
2. Understand pointers, structure and union
3. Implement string functions in C language

Unit I
Functions (Structure and Block):- Declaration, Calling (Call by value, Call by Suggested), Definition of functions, Recursion, Storage Class (auto, static, register, extern), Scope rules (Local, Global).

Unit II
Pointers:- Pointers and addresses, Pointers as Function arguments, Pointers and Arrays, Address Arithmetic, Character Pointers and functions, pointers arrays, pointer to functions. String Handling and string functions (strlen, strcat, strcmp, strcmpi, strrev, strcpy).

Unit III
Structures and Union (Structure and Block) : Basics, Structures and Functions, Arrays of Structures, Pointers to structures, typedef.
File handling - opening, closing, reading, writing & appending in files.

Reference Books:
- Let Us 'C' -Yashavant P Kanetkar, BPB Publications
- Programming in Ansi 'C' – Balaguruswami – TMH.
- 'C' Programmiung Language – Kernighan & Ritchie - PHI

- 'C' How to Program – Dietel & Dietel - PHI
- 'C' Programmiung - Dr. Neeraj Bhargava & Dr. Ritu Bhargava, AlkaPublicationas

BCA – 206 Multimedia Basics - II

Max. Marks : 75   **Min. Marks: 30**
                                                                                  Duration : 2 ½ Hrs.

Objectives:
1. Compare different image types and compression
2. Study laws of multimedia and design environment
3. Design basic animations and gif images using flash

Unit – I

Images: Raster and Vector image, applications of image, image capture, Image compression: Lossy and Lossless Compression, advantages and disadvantages of image compression, audio compression and decompression, audio synthesis, speech recognition and Speech Synthesis.

Unit – II

Digital video Interface, jpeg image compression, mpeg video compression.
Developing Applications using multimedia, methodology and design, Various multimedia laws: Patent law, Trademark Law, Trade secret Law, Copyright Law.

Unit – III

Introduction to Flash: Tools of Flash (Pen, Pencil, Paint Bucket Tool, Eye Dropper, Text, 3D rotation etc), Drawing object in flash (line, curve, oval, Rectangle , Polystar tool) , Layers and its types in flash. Keyframes. Object based animation, motion tween , classic tween and shape tween.

Reference Books
- Fundamental of multimedia ,Ritu Bhargava, AlkaPublicationas
- Fundamental of multimedia "Drew, Feurun, 2004.
- Adobe Flash CS4: Illustrated Barbara M. Waxer

Course Structure in Semester – III

Semester - III							
Paper Code	Theory Papers	CIA	ESE	Max. Marks	Min. Marks	Duration	
BCA – 301	Data Structure & Algorithm – II	25	50	75	30	2 ½ Hr.	
BCA – 302	Database Management Systems - I	25	50	75	30	2 ½ Hr.	
BCA – 303	Computer Communication & Networking	25	50	75	30	2 ½ Hr.	
BCA – 304	Object Oriented Programming with C++	25	50	75	30	2 ½ Hr.	
BCA – 305	Java Programming - I	25	50	75	30	2 ½ Hr.	
BCA – 306	Computer Graphics - I	25	50	75	30	2 ½ Hr.	
	Practical Papers						
BCA – 307	C++ Programming - Laboratory	10	40	50	20	3 Hr.	
BCA – 308	Java Programming - Laboratory	10	40	50	20	3 Hr.	
BCA – 309	Computer Graphics - Laboratory	10	40	50	20	3 Hr.	
	Total	**600**	**240**				

BCA – 301   Data Structure and Algorithms - II

Max. Marks : 75   **Min. Marks: 30**
                                                                               Duration : 2 ½ Hrs.

Objectives:
1. Design linear data structure using stack and queue.
2. Evaluate expressions using stack
3. Understand the tree data structure and implement its traversing
4. Analyze the basic of graph theory and applying recursion.

Unit I

Stacks and Queues: Introduction to stacks, Representation of stacks, Implementation of stacks using Array & Link List, Uses of stacks (evaluating expression).
Introduction to queues, Implementation of queues (with algorithm), Circular Queues.

Unit II

Trees: Definition & Basic concepts, linked tree representation, Introduction to Binary Tree, Traversing Binary Trees (Pre order, Post order and Inorder), Concept of Binary search tree, algorithm of Searching, inserting and deleting in binary search trees.

Unit III

Graph: Introduction to graphs, types of graphs (complete,weighted,unweighted,simple), Representation of Graph: adjacency Matrix, incidence Matrix, Graph Traversal: Breadth first search, Depth first search.
Recursion: Fibonacci, Tower of Hanoi.

Reference Books:
- Data Structures & Algorithms through 'C' - Hariom Pancholi – Genius Publications
- Data Structures and algorithms in C++- Adam Drozdex, Vikas Publications
- Expert Data Structures with 'C' – R.B.Patel - Khanna Book Publications

- An introduction to data structures with applications -Jean-Paul Tremblay, TMH
- Data Structures in C/C++Tanenbaum, PHI

BCA – 302 Database Management Systems - I

Max. Marks : 75   **Min. Marks: 30**
Duration : 2 ½ Hrs.

Objectives:
1. Understand key concepts of database system
2. Apply the ER concept and ER mapping to relational Model.
3. Differentiate file organizations, relational algebra operations

Unit - I
Overview of DBMS: Basic Database terminology, Drawback of Conventional file system, database management system: Introduction, advantages and disadvantages, DBMS components, DBA and his responsibilities, Data Abstraction, Schemas and Instances, Physical and Logical Data Independence.

Unit – II
Architecture of DBMS: Client/Server Architecture, 2 Tier & 3 Tier.
Entity-Relationship Model: Concept, Entity, Entity Set, Attributes, Relationships, Keys (Types), Generalization, Specialization, Aggregation, Overview Of Hierarchical, Network And Relational Models, Comparison of Network, Hierarchical and Relational Models.

Unit - III
File Organization: Introduction, Types (Sequential, Direct, Indexed sequential).
Relational Algebra: Set Operators (Union ,Intersection, Set-Difference, Cartesian Product), **Relational Operators:** (Select, Project, Rename, Join) , Decomposition of Relation Schemes, Dependencies and its types, Normalization up to BCNF.

Reference Books:
- Fundamentals of Database Systems- Elmasri And Navathe Benjamin/Cummings Publishing Co. Inc.
- An Introduction to Database Management System - Bipin C. Desai
- An Introduction to Database system-C.J. Date Narosa Publishing House.

BCA-303 Computer Communication and Networking

Max. Marks : 75   **Min. Marks: 30**
Duration : 2 ½ Hrs.

Objectives:
1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Transmission Media and Error checking and correction method
3. Gain core knowledge of Asynchronous transmission Mode

Unit I
Networking Basics: Introduction to digital communications, Types of network: LAN, WAN, MAN,
Types of network terminal: Client (Thin, Fat, Hybrid), Server (File, Mail, Application, Communication, Database, Print), Client Server Model
Topology: Bus, Ring, Star, Tree/Snowflake, Mesh, Combined/ Hybrid
Terminology: Amplitude, Frequency, Phase, Bit rate, Baud rate, Bandwidth.
Signal types: Analog signals, Digital signals, Periodic, Aperiodic
 Modulation: Amplitude, Frequency, Phase, Demodulation

Unit II
Transmission Media: Guided (Twisted pair cable, Coaxial cable, Fiber Optic Cable), Unguided (Radio waves, Microwaves, Infrared), Transmission Mode: Parallel, Serial

Networking Devices: Repeater, Router, Hub, Switch, Bridge, Gateway
Switching: Introduction, Types (circuit, packet, message)
Multiplexing: Frequency division, Wavelength division, Time Division, Demultiplexing

Unit III

Protocol: Standards, Architecture, OSI Model, TCP/IP Model, HDLC
Asynchronous transfer mode: Introduction, Protocol architecture, ATM cells, ATM layers,
Point to Point Protocol: point-to-point layers, link control protocol, network control protocol.
Error classification: Types of errors (Single Bit Error, Burst Error).

Reference Books:
- Data and Computer communications, William Stallings, PHI
- Data communication and networking, Behoruz A. Forouzan
- Data communication and networking, A S Godbole, Tata McGrawhill
- Network concepts and Architecture, Hancock, BPB Publications
- Data Communication and Networking, Tannenbaum, PHI

BCA – 304   Object Oriented Programming with C++

Max. Marks : 75   **Min. Marks: 30**
                                                                        Duration : 2 ½ Hrs.

Objectives:
1. Understand and apply OOP's features and C++ concepts
2. Construct class and object using constructors
3. Apply the concept of polymorphism and inheritance

Unit - I

Introduction to OOP's and its basic features: Data types (Built- in, User Defined), variables, keywords, constant, operator, Expression, Evolution of OOP, Advantages of OOP Concepts of object oriented language-objects, classes, inheritance, encapsulation, abstraction, polymorphism, methods
Comparison between functional programming and OOP approach,

Unit – II

Classes, data member, member functions, objects, arrays of class objects, pointers and classes, constructors, destructors, Static Class Member, friend functions.
Dynamic memory allocation: New & Delete operator.

Unit - III

Inheritance, types of inheritance, member access control, abstract class, virtual class & functions
Polymorphism: Binding, Function overloading, Function overriding, Operator overloading,.
Reference Books:
- Object Oriented Programming with C++, E. Balagurusamy, Tata McGraw Hill.
- OOPS with C++, N P Bhave,
- OOPS with ANSI C++, A N Kamthane,
- "Object-Oriented Programming in C++", Robert Lafore, Galgotia Publications.
- "Object-Oriented Programming using C++", B. Chandra, Narosa Publications.

BCA – 305   Java Programming - I

Max. Marks : 75   **Min. Marks: 30**
                                                                        Duration : 2 ½ Hrs.

Objectives:
1. Describe the features of Java
2. Develop programs with basic programming constructs.
3. Experiment with branching & Looping and Arrange data in Arrays and formalize the OOP concept and validate its real world implementation

Unit - I

JAVA: Introduction to Object Orientated Programming, Abstraction, Object Oriented Programming Principles, Features of JAVA, Introduction to JAVA byte code, Program elements; Primitive data types, variables, Input Output in Java, operators: arithmetic, assignment, logical, bit wise, relational , Boolean logical operators, operator precedence.

Unit - II

Control statements: Java's Selection Statements, if statement, switch statement, Iteration statements, while, do-while, for-each, Nested loop, Jump Statement, using break, continue, return. Arrays, One & Two Dimensional Array

Unit – III

Object and classes: Objects, constructors, returning and passing objects as parameter, Nested and inner classes. Inheritance: Definition & its Types, Extended class, usage of Super, Overloading and overriding methods, Abstract classes, using final with inheritance.

Reference Books:
- Introduction to Java Programming, Y. Daniel Liang, PHI.
- Java Complete Suggested Books:, Patrick Naughton, Tata McGraw Hill.
- The Java Handbook, Patrick Naughton, Tata McGraw Hill.
- Introduction to Java Programming, E Balaguruswamy, PHI.

BCA – 306   Computer Graphics – I

Max. Marks : 75　　　　　　　　　　　　　　　　　　　　**Min. Marks: 30**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Duration : 2 ½ Hrs.

Objectives
1. Understand the structure of modern computer graphics systems and Input output Device
2. To familiarize with Video Display device
3. To implement various algorithms to scan, convert the basic geometrical primitives

Unit - I

Graphics hardware

Input devices: Keyboard, touch panel, light pens, graphic tablets, joysticks, track ball, data glove, digitizer, image scanner, mouse, voice systems.

Hard copy devices: Input and non-impact printers such as line printer, dot matrix, laser, inkjet, Plotters.

Unit – II

Video Display Devices: Refresh cathode ray tube, raster scan displays, random scan displays, color CRT monitors, direct view storage tube, flat panel displays, 3-D view devices, virtual reality, raster scan systems, random scan systems, graphics monitors and work stations.

Unit – III

Scan conversion algorithms for Line : function, increment / decrement, equation, algorithm (Digital Differential, Bresenham's) Circle: function, equation (Polynomial & Trigonometry), algorithm (Bresenham's & Mid-Point) Ellipse: function, equation (Polynomial & Trigonometry), Bresenham's algorithm, Area filling techniques: Scan Line, Boundary Fill, Flood Fill Algorithm,

Reference Books:
- Computer Graphics- Principles and Practice- J. Foley, A. Van Dam, S. Feiner, J.Hughes:Pearson
- Principles of Interactive Computer Graphics-Newman and Sproull, Tata McGraw Hill
- Computer Graphics, Plastok and Gordon Kalley, McGraw Hill
- Computer Graphics, Cornel Pokorny, BPB Publications.

Course Structure in Semester - IV

Paper Code	Theory Papers	CIA	ESE	Max. Marks	Min. Marks	Duration
BCA – 401	Discrete Mathematics	25	50	75	30	2 ½ Hr.
BCA – 402	Operating System	25	50	75	30	2 ½ Hr.
BCA – 403	Python Programming	25	50	75	30	2 ½ Hr.
BCA – 404	Database Management Systems - II	25	50	75	30	2 ½ Hr.
BCA – 405	Java Programming - II	25	50	75	30	2 ½ Hr.
BCA – 406	Computer Graphics - II	25	50	75	30	2 ½ Hr.
	Practical Papers					
BCA – 407	DBMS - Laboratory	10	40	50	20	3 Hr.
BCA – 408	Java Programming - Laboratory	10	40	50	20	3 Hr.
BCA – 409	Computer Graphics - Laboratory	10	40	50	20	3 Hr.
			Total	**600**	**240**	

BCA – 401 Discrete Mathematics

Max. Marks : 75   **Min. Marks: 30**
                                                            Duration : 2 ½ Hrs.

Objectives:
1. Apply set operations to solve applied problems
2. Examine the validity of argument by using Propositional Calculus
3. Understand different graphs and matrix operations.

Unit I
Sets: Elements of a set, methods of describing a set, types of sets, Operations on sets-- union, intersection and difference of sets, Associative Laws, Distributive laws, DeMorgan's laws, Venn Diagrams, ordered pairs, Cartesian product of two sets.

Unit II
Relation: Basic definition of relation and types of relations (reflexive, irreflexive, symmetric, A-symmetric, transitive, anti symmetric, equivalence), Binary relations, domain, range, inverse and composite.
Algebra of logic: Propositions and Logic operations, truth tables, arguments and validity of arguments, propositions generated by a set, equivalence and implication laws of logic,

Unit III
Logical Connectives – Disjunction, Conjunction, Negation, Conditional Connectives, Quantifiers.
Graph Theory: Definition, Basic terminology, Types of graph (Simple, Multi, Pseudo, Finite & Infinite, Null, Complete, Cyclic & Acyclic, Weighted & Unweighted graph),
Matrix operations: addition, subtraction, multiplication
Matrix representation of graph: Adjacency matrix, Incidence Matrix
Reference Books:

- Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH
- C.L. Liu, "Elements of Discrete Mathematics", TMH.
- Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI.
- Narsingh Deo, "Graph Theory With Application to Engineering and Computer Science", PHI.

BCA – 402   Operating System

Max. Marks : 75   **Min. Marks: 30**
Duration : 2 ½ Hrs.

Objectives:
1. Understand the structure and functionalities of an OS
2. Apply scheduling algorithms
3. Apply different page replacement algorithms and understand concept of memory management

Unit I

Introduction to Operating Systems, goals of OS, Operations of OS, Classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, structure of OS, layer design of DOS, Unix..

Unit II

Process concept, process scheduling, fundamental of scheduling, scheduling criteria, long medium short term scheduling, CPU scheduling algorithms: FCFS, SJF, Priority, RR, Threads.

Unit III

Logical versus physical address, contiguous allocation, fragmentation, compactation, swapping, segmentation, paging, page replacement algorithm, virtual memory, virtual memory with paging, demand paging.

Reference Books:
- Operating System Concepts, Galvin, Addison Wesley
- Operating Systems, Ritchie, BPB Publications.

BCA- 403 Python Programming

Max. Marks : 75   `Min. Marks: 30**
Duration : 2 ½ Hrs.

Objectives
1. Improve programming skills
2. Hands on Regular Expression
3. Ability to Text Processing scripts

Unit- I

Introduction: History, Versions, Features, Advantages, Application areas.
Python Basics: IDLE, Editors, Keywords, Identifiers, Indents, Input Output Basic Syntax, Variable, Dynamic Typing, Data Types (Mutable and Immutable), Built-in Conversion Methods.
Operator: Arithmetic, Comparison, Logical, Identity, Membership.
Control Statements: Conditional (If , If- else, Elsif, Nested if-else), Looping (While, For, Nested loops), Break, Continue, Pass.
Array: Introduction, Creation, Traverse, Insertion, Deletion, Search, Update.

Unit- II

String: Introduction, Types, Escape Sequences, Formatting, Operators, Built-in Methods (Capitalize, Upper, Lower, Title, Find, Count, Isalpha, Isdigit, Islower, Isupper), Basic Operations (Accessing, Updating, Concatenation).
List & Tuple: Introduction, Accessing, Operators, Built-in Methods (Len, Max, Min, Append, Insert, Remove, Pop, Reverse, Sort, List), Basic Operations (Updating, Delete, Concatenation, Indexing, Slicing).

Set:Introduction, Accessing, Built-in Methods (Add, Update, Clear, Copy, Discard, Remove), Operations (Union, Intersection, Difference).

Dictionary: (Single Dimensional) Introduction, Accessing, Updating, Deleting, Viewing values in dictionaries, Built-in Methods (Len, Max, Min, Pop, Clear, Items, Keys, Values, Update).

Unit- III

Function: Defining, Calling, Function Arguments (Required, Keyword, Default, Variable Length) Anonymous Functions, Global and Local Variables.

Modules: Introduction, Importing Module, Built-in Modules (Math, Statistics, Random).

Package: Creating, Installing, Importing Modules from the Package.

Errors & Exception: Error Types, Exception Handling - Introduction, Try, Except, Else, Finally.

File Input-Output: Opening and Closing files, Reading and Writing files.

Reference Books:

- Let Us Python – YashavantKanetkar, BPB Publications.
- Python The Complete Suggested Books: – Martin C. Brown, McGraw Hill
- Core Python Programming – R. NageswaraRao, Dreamtech Press.

BCA – 404 Database Management Systems – II

Max. Marks : 75   **Min. Marks: 30**
                                                                     Duration : 2 ½ Hrs.

Objectives:
1. Understand basics of transactions and recovery
2. Study basics of SQL language
3. Understand various constraints needed for a database system and executing operations on relational databases

Unit – I

Transaction management: Concept, ACID Properties, Schedules : Serial and non serial schedules, Serializability, concurrency. Deadlock : handling , detection and prevention. Recovery techniques: log based recovery.

Unit – II

Introduction to SQL, E.F.Codd's rules, Components of SQL, Data Types, DDL & DML Commands (create, alter, insert, delete and update) & Constraints: Primary Key, Foreign Key, Check Constraints, Unique & Not Null.

Unit – III

Searching, Matching & Basic Oracle Functions : String, Numeric, Aggregate & Conversion Functions, Queries based on group by clause, Subqueries & joins.

Reference Books:

- Fundamentals of Database Systems- Elmasri And Navathe Benjamin/Cummings Publishing
- SQL Complete Suggested Books:- Leon and Leon, Tata McGraw Hill
- SQL, PL/SQL Programming Language- Ivan Bayross, BPB Publications
- Database Management System- Korth, Tata McGraw Hill

BCA – 405   Java Programming – II

Max. Marks : 75   **Min. Marks: 30**
                                                                     Duration : 2 ½ Hrs.

Objectives:
1. Generalize the classes & interfaces in form of packages.
2. Practice with various String methods and test and Handle programs with run time errors.
3. Organize the program for simultaneous execution by using Threads and develop a GUI based interface using Applets.

Unit I

PACKAGE AND INTERFACES: Defining package, Concept of classpath, access modifiers, importing package, Defining and implementing interfaces.

Unit II
STRING HANDLING: String constructors, special string operation, character extraction, searching and comparing string, strings, string Buffer class.

EXCEPTION HANDLING: Exception handling fundamentals, Exception types, try, catch and multiple catch statements. Usage of throw, throws and finally.

Unit III
THREADING: Multithreading, multiprocessing, life cycle of thread, Garbage collection, and deadlock. File handling: input and output stream.

Applet: applet Fundamentals, applet life cycle, using paint method and drawing polygon

Reference Books:

- Introduction to Java Programming, Y. Daniel Liang, PHI.
- Java Complete Suggested Books:, Patrick Naughton, Tata McGraw Hill.
- The Java Handbook, Patrick Naughton, Tata McGraw Hill.
- Introduction to Java Programming, E Balaguruswamy, PHI.

BCA – 406   Computer Graphics - II

Max. Marks : 75   **Min. Marks: 30**
                                                                          Duration : 2 ½ Hrs.

Objectives

1. To define the fundamentals of 2D transformations
2. To describe the importance of Clipping, viewing and projections
3. To learn the basic principles of 3- dimensional transformation along with surface identification and Curves

Unit – I
Geometric transformations (translation, scaling rotation, reflection, shearing), 2-dimensional graphics: Cartesian and Homogeneous co-ordinate system, Window to Viewport transformation, Composite transformation, Affine Transformation.

Unit – II
Clipping Techniques: Clipping in Raster, point clipping, Line clipping, Cohen-Sutherland Line clipping Algorithm, Cyrus-Beck Line clipping Algorithm.

3-D viewing Mathematics of Projections: Types of Projection: Parallel & Perspective.

Unit – III
Introduction to 3-dimensional Graphics: Geometric Transformations Translation, Scaling, Rotation, Visible line identification, Visible Surface Detection (Back-face, Painter's Algorithm), Polygon (surface, table, equation, mashes).

Reference Books

- Computer Graphics- Principles and Practice- J. Foley, A. Van Dam, S. Feiner Hughes:Pearson
- Principles of Interactive Computer Graphics-Newman and Sproull, Tata McGraw Hill
- Computer Graphics, Hern & Becker, Pearson Publication
- Computer Graphics, Cornel Pokorny, BPB Publications.

Course Structure in Semester – V

Paper Code	Theory Papers	CIA	ESE	Max. Marks	Min. Marks	Duration
	Semester - V					
BCA – 501	E Commerce	25	50	75	30	2 ½ Hr.
BCA – 502	Mobile Computing - I	25	50	75	30	2 ½ Hr.
BCA – 503	Open Source Operating System	25	50	75	30	2 ½ Hr.
BCA – 504	VB. Net Programming	25	50	75	30	2 ½ Hr.
BCA – 505	Advance Database Management System	25	50	75	30	2 ½ Hr.
BCA – 506	Internet Tools & Website Development - I	25	50	75	30	2 ½ Hr.
	Practical Papers					
BCA – 507	VB. Net Programming - Laboratory	10	40	50	20	3 Hr.
BCA – 508	ADBMS - Laboratory	10	40	50	20	3 Hr.
BCA – 509	Internet Tools & Website Development (Java Script) - Laboratory	10	40	50	20	3 Hr.
	Total			**600**	**240**	

BCA – 501 E Commerce

Max. Marks : 75   **Min. Marks: 30**
                                                                                    Duration : 2 ½ Hrs.

Objectives:
1. Define E-commerce and its impact in different areas.
2. Understand different Business Models
3. Handle electronic transactions in secure way

Unit – I

E-Commerce -Introduction, Objectives, Advantage, Disadvantages, Traditional commerce Vs. E-Commerce, Partial Vs Pure E-commerce . Impact of E-Commerce in different areas , The anatomy of E-commerce ,

Unit – II

Framework of E-commerce, Business Models based on the relationship of Transaction Parties Business - to - Business (B2B),Business - to - Consumer (B2C),Consumer - to - Consumer (C2C),Consumer - to - Business (C2B),Business - to - Government (B2G),Government - to - Business (G2B),Government - to - Citizen (G2C),Intra- Business Organizational.
Business Models based on the relationship of Transaction types: Brokerage model, Aggregator and Advertising model.

Unit – III

EDI :Introduction, EDI Documents, Steps in an EDI System, Advantages of an EDI System, Application of EDI in business.
Electronic Payment Systems: Introduction, Features, Types (E-Cash, E-cheque, credit card, Smart Card, Electronic Purses) E-Customer Relationship Management, Security Threats (Active, Malicious, Server side)

Reference Books:
1. The Complete E Commerce Book − Janice Reynolds − CRC Press
2. E Commerce A Beginners Guide - Daniel D'Apollonio − Google Books
3. HTML Black Book − Steven Holzner − DreamTech

BCA – 502 Mobile Computing - I

Max. Marks : 75   **Min. Marks: 30**
                                                       Duration : 2 ½ Hrs.

Objectives:
1. Define different types of network, represent them with different designs and summarize the signals and modulation.
2. Simulate the process of signal transfer over different media.
3. Outline the mobile communication.
4. Compare different handoffs, current trends and protocols.

Unit - I
Networking Basics: Introduction to digital communications, Types of network: LAN, WAN, MAN, Types of network terminal: Server, Client,
Topology: Bus, Ring, Star, Tree/Snowflake, Mesh, Combined,
Terminology: Amplitude, Frequency, Phase, Bit rate, Baud rate, Bandwidth.
Signal types: Analog signals, Digital signals,
 Modulation: Amplitude, Frequency, Phase, Demodulation,

Unit II
Transmission Media: Guided (Twisted pair cable, Coaxial cable, Fibre Optic Cable), Unguided (Radio waves, Microwaves, Infrared), Transmission Mode: Parallel, Serial,
Mobile Computing: Mobile Computing Vs wireless Networking, Mobile Computing Applications, Characteristics of Mobile computing , Structure of Mobile Computing Application, Mobile Communication: requirements

Unit III
Mobility Management: Handoff Techniques, Types of Handoff, Current trends: 3G, 4G and 5G, Global Positioning System (GPS) Mobile IPv6, FTP, VLAN, HTTPS
Reference Books:
1. Mobile Communications, Second Edition, Jochen Schiller. Addison- Wesley.
2. Wireless Communication & Networking Made Simple, Prof. Satish Jain, Vineeta Pillai, BPB Publications.

BCA – 503   Open Source Operating System

Max. Marks : 75   **Min. Marks: 30**
                                                       Duration : 2 ½ Hrs.

Objectives:
1. Understand open source software's utilities
2. Execute shell commands
3. Understand user and editors in Linux

UNIT – I
Introduction of Open Source Software, Need of Open Source, comparison with Closed source / Proprietary software. Linux Architecture, Linux file system (inode, Super block, Mounting and Unmounting), Types of File system, Kernel, Process Management in Linux.

UNIT – II
Shell Commands: user access commands, directory commands, file manipulation commands, security and protection commands, inter user and inter-machine communication, information commands, process management commands, program development and debugging commands, system administration

commands, I/O Redirection and Piping, Relation and Absolute path, hard link and soft link, Linux Directory types, User and its Home Directory Vi editor

UNIT – III

Shell Programming – Introduction to Shell, Various Shell of Linux, Shell Variables, Shell keywords, control statements- if-then-else, case-switch, While, Until, Find, Shell Metacharacters.
 Booting and Shutting down BootLoaders: LILO, GRUB, Bootstrapping, init Process.

References Books:
- A practical Guide to Linux, Sobell, Pearson.
- A Practical Guide to Linux Commands, Editors, and Shell Programming, Sobell, Pearson.
- A Practical Guide to Fedora and Red Hat Enterprise Linux, Sobell, 5e, Pearson.
- Redhat Linux 6.0 Administration Wiley

BCA – 504   VB. Net Programming

Max. Marks : 75   **Min. Marks: 30**
                                                                        Duration : 2 ½ Hrs.

Objectives:
1. Understand the .net Framework
2. Know the use of variables and operators
3. Design user interface and apply looping and decision making .
4. Connect with database

Unit - I

Overview of .NET Framework
What is .NET framework, Origins of .NET, Architecture & Components, Common Language Runtime, Common Type System, Common Language Specification, MSIL, Framework Base Classes & Namespaces, IDE, .NET Languages.

Visual Basic Language Features:
Introduction to VB.NET, Program Structure and Code Conventions, Data Types & Variables, Constants & Enumerations, Operators,

Unit – II

Decision making & Looping, Arrays & Strings, Date & Time, Procedures in VB.

Building a User Interface:
The Visual Basic Environment, Event-Driven Programming, Building Forms: The Basics & Advanced Techniques, Working with Traditional Controls: Label Control, Text Box, Creating Buttons, Option Buttons, List Box, Combo Box.

Unit – III

Using Advanced Controls: Creating Timers, Dialog Boxes, Picture Box, List View Control, Tree View Control, Menus and Toolbars.

Working with Database:
Introduction to ADO.NET, Connecting to a database, DataTables, DataRow, Navigating records, Adding, editing, and deleting records.

Reference Books:
- The Complete Reference Visual Basic .NET, Jeffery R Shapiro (McGraw−Hill/Osborne)
- Application of .NET Technology, Module- 4.1-R4 By Prof. Satish Jain (BPB Publications)

BCA – 505   Advance Database Management System

Max. Marks : 75   **Min. Marks: 30**
                                                                     Duration : 2 ½ Hrs.

Objectives:
1. Compare and Contrast between different types of databases.
2. Optimize the operations
3. Implement basic operations of database language
4. Handle the events occurring on database and explicit error handling

Unit – I

Query optimization & processing: algorithm for external sorting, select & join operation, project & set operations. Temporal and multimedia databases.
Parallel Databases : I/O Parallelism, Interquery Parallelism, Intraquery Parallelism.

UNIT - II

Distributed Databases: Distributed Data Storage, Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases
Introduction to PL/SQL and its advantages over SQL, PL/SQL block structure, variables and constants, attributes, character set, data types, control structures, conditional control.

UNIT- III

Sequential control, Error handling in PL/SQL, creating function & procedure, package functions, package procedures, Oracle transactions
Database Triggers: Introduction, Use & type of database Triggers, Triggers Vs. Declarative Integrity Constraints, BEFORE Vs. AFTER Trigger Combinations, Creating a Trigger, Dropping a Trigger.

Reference Books:-
- SQL Complete Reference, Leon and Leon, Tata McGraw Hill
- SQL, PL/SQL Programming Language, Ivan Bayross, BPB Publications
- DB2 Developer's Guide, Mullins, BPB Publications
- Data Base Management System, Navathe, Pearson Education Asia.

BCA – 506   Internet tools and Website Development

Max. Marks : 75   **Min. Marks: 30**
                                                                     Duration : 2 ½ Hrs.

Objectives:
1. To get familiar with basics of the Internet
2. To acquire knowledge and skills for creation of web site considering client side programming using Javascript
3. To learn the function Date, Math, String and Events and Event Handlers

Unit – I

Internet and www: Introduction to internet and its application, email, Telnet, File transfer protocol (FTP), Internet Service Provider (ISP), Domain Name Server (DNS), Internet address, www and its evolution, Uniform Resource Locator (URL) and its types, Browsers: Internet Explorer, Chrome, Mozila firrefox, Opera, Search Engine, Web Server, Apache, IIS, Proxy, HTTP Protocol

Unit – II

Java Script : Introduction, Keywords, variables, Data type(Numbers, Booleans, Strings, Objects, Null, Undefined**), Operators** : Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment/ Decrement Operator, Bitwise Operator, Conditional operator, Comma operator, delete, new, this, Expression, Comment, Input-output
Control Structure: if-else, switch, Loop: while, do-while, for, for-in, break, continue, return, import, export.

Unit – III

Array: create, access, methods (length, sort)
Function: **Built-in-Function:** (eval(),infinite(), isNaN(), parseFloat(), parseInt()),

User-defined-Function : (create, calling, return)
Boolean : toString, valueof()
Date: getYear(), setYear(), getMonth(), setMonth(), getDate(), setDate(), getDay(), getTime(), setTime(), getHours(), setHours(),getMinutes(), setMinutes(), getSeconds(), setSeconds()
Math: abs(), min(), max(), pow(), round(), sqrt()
String: Length, indexOf, lastIndexOf(), search(), slice(), substring(), replace(), toUpperCase(), toLowerCase(), concat(), String.trim(), charAt, charCodeAt
Events and Event Handlers : General Information about Events, Defining Event Handlers, events: onClick, onDblClick, onKeyPress, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove
Reference Books:-
- Introduction to Java Programming, Y. Daniel Liang, PHI.
- Java Complete Reference, Patrick Naughton, Tata McGraw Hill.
- The Java Handbook, Patrick Naughton, Tata McGraw Hill.

Course Structure in Semester - VI

	Semester – VI					
Paper Code	**Theory Papers**	**CIA**	**ESE**	**Max. Marks**	**Min. Marks**	**Duration**
BCA – 601	Software Engineering	25	50	75	30	2 ½ Hr.
BCA – 602	Mobile Computing - II	25	50	75	30	2 ½ Hr.
BCA – 603	Information Protection & Security	25	50	75	30	2 ½ Hr.
BCA – 604	C # Programming	25	50	75	30	2 ½ Hr.
BCA – 605	Internet Tools & Website Development - II	25	50	75	30	2 ½ Hr.
BCA – 606	Project	25	50	75	30	2 ½ Hr.
	Practical Papers					
BCA – 607	Mobile Computing (Android) - Laboratory	10	40	50	20	3 Hr.
BCA – 608	C # Programming - Laboratory	10	40	50	20	3 Hr.
BCA – 609	Internet Tools & Website Development (PHP) - Laboratory	10	40	50	20	3 Hr.
			Total	**600**	**240**	

BCA – 601 Software Engineering

Max. Marks : 75   **Min. Marks: 30**
                                                            Duration : 2 ½ Hrs.

Objectives:
1. Understand basic concepts of software engineering.
2. Compare different software engineering process models
3. Create architectural design for a given project
4. Apply different testing techniques

Unit – I

Software Engineering : Introduction, definition , Software Characteristics, Applications
Software Process: Introduction, Framework..Process, Project and people.
 SDLC, Process Models: Waterfall, Spiral, Prototyping & Incremental Model.

Unit – II

Software Measurement: Size metric
Design: Introduction , Definition, Objective ,Modularity(Cohesion & Coupling)
Coding: Introduction, Code Review (Code Walkthrough, Inspection, Clean room Approach)

Unit – III

Testing: Introduction, Objective, Characteristics, Principles, Testability
Software Testing Strategies: Unit Testing, Integration Testing, Validation Testing (Alpha and Beta Testing), Verification, System Testing (Recovery, Security, Stress, Performance),
Black Box Testing and White Box Testing : Introduction and Comparison.

Reference Books:
- Roger S. Pressman, "Software Engineering – A Practitioner's Approach ", Sixth Edition, McGraw
- R.E. Fairley, "Software Engineering Concepts", Paperback Edition, McGraw Hill.
- Jalota, "An Integrated Approach to Software Engineering", Third Edition, Narosa Publishing House

BCA – 602 Mobile Computing-II

Max. Marks : 75   **Min. Marks: 30**
                                                            Duration : 2 ½ Hrs.

Objectives:
1. Recognize the importance of Android in Mobile Computing.
2. Illustrate the complete process of Android Installation.
3. Develop small to medium size Android apps for general programming problems.
4. Rearrange the app logic on the basis of Lifecycle.

Unit – I

Android Intoduction: History of Android, Definition of Android , Need of Android, Features of Android, Android Applications, Categories of Android applications, API level.
Android - Environment Setup: Set-up Java Development Kit (JDK) - JDK Versions, Download JDK, Install JDK and JRE, JDK's "bin" PATH, Set the Environment Variable JAVA_HOME, Verify the JDK Installation, Android IDEs: Android Studio - Install "Android Studio IDE" (For Windows), Installing Android SDK, Setup Emulator (Android Virtual Device AVD), Eclipse IDE.

Unit – II

Android Application: Create Android Application, Anatomy of Android Application, Folder, File & Description, .java source files , res/drawable, res/layout, res/values, AndroidManifest.xml, The Main Activity File, The Manifest File, The Strings File, The Layout File, Running the Application - Run the Android App on Emulator. Run the Android App on Real Devices
Android - UI Layouts: Linear Layout, Relative Layout, Constraint layout, Layout Attributes, View Identification

Unit – III

Android - Architecture: Linux kernel, Android Libraries, Android Runtime, Application Framework, Applications.

Android - Activities: Activity life cycle - onCreate(), onStart(), onResume(), onPause(), onStop(), onDestroy(), onRestart(),

Android - Broadcast Receivers: Creating the Broadcast Receiver, Registering Broadcast Receiver, Event Constant & Description.

Reference Books:
- Android Application Development, Rick Rogers, O'Reilly.
- Starting with Android, M.M. Sharma-Rashmi Aggarwal, BPB Publications.

BCA – 603 Information Security & Protection

Max. Marks : 75 **Min. Marks: 30**
 Duration : 2 ½ Hrs.

Objectives:
1. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks
2. Understand the concept of encryption and analyze various symmetric & asymmetric encryption algorithm
3. Familiarize with network security designs using available secure solutions such as SSL and IPSeC

Unit – I
Introduction to the concepts of security: need for security, types of attacks, cryptographic techniques: plain text and cipher text, substitution and transposition techniques: Caesar cipher, modified Caesar cipher, monoalphabetic cipher, Vigenere cipher, hill cipher, Vernam Cipher.
stegnography, key range and key size.

Unit – II
Computer based   symmetric key cryptographic algorithm: Introduction, algorithm types: stream cipher and block cipher and mode: ECB, CBC, CFB, OFB. An overview of symmetric key cryptography, basics of data encryption standard DES,
Computer based asymmetric cryptographic algorithm: Introduction of asymmetric key cryptography, an overview of asymmetric key cryptographic, and the RSA algorithm.

Unit – III
Internet security protocols: basic concepts, secure socket layer SSL, Secure hyper text transfer protocol. User authentication mechanism: passwords, certificate based authentication, biometrics authentication.

Reference Books:
1. Cryptography and Network Security - William Stallings – Pearson
2. Behrouz A. Forouzan and D. Mukhopadhyay- Cryptography & Network Security, 2nd Edition - 1st reprint 2010, McGraw Hill, New Delhi.
3. Wade Trapple, Lawrence C. Washington- Introduction to Cryptography with coding Theory, 2nd Edition pearson Education

BCA – 604 C # Programming

Max. Marks : 75 **Min. Marks: 30**
 Duration : 2 ½ Hrs.

Objectives:
1. Understand and apply concept and features of C#
2. Know the concept of OO Features
3. Handle events and errors occurring in the system

Unit – I
Introduction: .Net Framework, CLR, CTS, CLS, FCL & Advantages of .Net Framework.

C# : Evolution, History & Overview. **Fundamentals of C#:** Identifiers, Keywords, Literals, Punctuators, Operators. **Data Types :** Value Type & ReferenceType. **Expressions**: Implicit & Explicit Conversion (Boxing & Unboxing). **Program Flow Controls:** Decision Control -(if, if – else, Nesting), Switch, Ternary. Loop – (while, do-while, for, foreach, Nesting). break, continue, goto statements.
User Defined Data Types: Arrays (Single, Multi & Jagged), Structure & Enum.

Unit – II

Introduction of OOP: Objects, Class, Encapsulation, Polymorphism, Inheritance :
Class: Structure of Class, Objects, Class Modifiers (private, public, protected, internal, protected internal, abstract, sealed) Constructors (default, parameterized, Copy), Destructor. This reference, Static, Constant and Readonly members. **Methods**: Parameter Passing (Value, Reference, Params).
Inheritance, Polymorphism, Interfaces: Concept, Types, Modifiers (Virtual, Override, New).

Unit – III

Method Overloading, Operator Overloading. Properties, Indexers, **Delegates**: Single Cast delegate, Multi Cast delegates, Passing delegate as parameter. **Events:** Concept & Declaration, Event Handlers.
Errors & Exceptions: Types of Errors, Try-Catch, Nested Try blocks, Throwing own exceptions, **Multithreading:** Creating & Starting a Thread, Scheduling, Synchronization.

Reference Books:
- Programming with C#, B.Rama Krishna Rao (PHI)
- Beginners Guide C#, Herbert Schildt (Mc Graw Hill)
- Let Us C# by Yashavant Kanetkar, Asang Dani (BPB Publications)

BCA – 605 Internet Tools & Website Development – II

Max. Marks : 75   Min. Marks: 30
                                                                    Duration : 2 ½ Hrs.

Objectives
- To impart knowledge server side programming using PHP
- To Develop the decision making statement logic under different concepts using XAMP server
- To gain ability to develop web applications database connectivity using MYSQL Database

Unit – I

PHP ─ Introduction, Common Uses of PHP, Characteristics of PHP, PHP ─ Environment Setup Installation on Windows, PHP ─ Syntax, Running PHP Script from Command Prompt PHP ─ Variable, Local Variables, Global Variables, Static Variables, Constants, Operator Types, Precedence of Operators

Unit – II

PHP: Decision Making: If...Else Statement, ElseIf Statement, Switch Statement,
Loop Types:, while , do...while, for, for each, break, continue ,
Arrays : Numeric Array, Associative Arrays, Multidimensional Arrays,
Strings function, Web Concepts, GET and POST, File Inclusion, File & I/O

Unit – III

PHP : Functions, Cookies, Sessions, Sending, File Uploading, Error and Exception Handling, PHP PHP and MySQL: Connecting to MySQL Database, Create MySQL Database Using PHP, Insert MySQL Database Using PHP, Delete Data to MySQL Database, Retrieving Data from MySQL Database

Reference Books:
1. PHP A Beginners Guide – Vikram Vaswani – McGraw Hill
2. Programming PHP – Kevin Tatroe, Peter Macintyre – O'Reilly
3. PHP & My SQL Web Development – Laura Thompson & Luke Welling – Addison Wesley

BCA – 606 Project

Max. Marks : 75   **Min. Marks: 30**
                                                                        Duration : 2 ½ Hrs.

Objectives:

- Formulate a real world problem and develop its requirements
- Develop a design solution for a set of requirements
- Generate alternative solutions, compare them and select the optimum one

Assignment:

- The project work should be done in a group (max. 3 students).
- Each student in the group must submit **two** copies of the project in the department.
- Project Work Duration : 60 hours per student.