Sri Sathya Sai College for Women, Bhopal
(An Autonomous College affiliated to Barkatullah University Bhopal) Session 2019-20

Faculty of Computer Science & Application

BCA(Bachelor of Computer Applications)

Class	**:**	**BCA I YEAR**
Paper	**:**	**I**
Paper Title	**:**	**Fundamentals of Computers**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Computer System: Definition, Characteristics, capabilities and limitations, Types of Computers: Analog, Digital, Micro, Mini, Mainframe & Super Computers, Generations of Computers, Server.

Smart Systems: definition, characteristics and applications. Definition of Embedded system, GIS, GPS, Cloud Computing, Concept of hardware, software and firmware. Use of computers in e-governance and various public domains and services.

Unit II

Computer organization: block diagram of computer and its functional Units.

Input devices - keyboard, scanner, mouse, light pen, bar code reader, OMR, OCR, MICR, track ball, joystick, touch screen camera, mic etc.

Output devices: monitors – classification of monitors based on technology -CRT & flat panel, LCD ,LED monitors, speakers, printers – dot matrix printer, ink jet printer, laser printer, 3D Printers, wi-fi enabled printers, plotters and their types , LCD/LED projectors.

Computer memory and its types, Storage devices: Magnetic tapes, Floppy Disks, Hard Disks, Compact Disc – CD-ROM, CD-RW, VCD, DVD, DVD-RW, usb drives, Blue Ray Disc, SD/MMC Memory cards.

Unit III

Programming Concept and its planning: Purpose of writing a program, Steps in Program Development, Characteristics of a Good Program, development of an Algorithm, Flow Charts through examples.

PROGRAMMING LANGUAGES: History, Classifications, Low Level, Assembly, High Level languages and 4GL, Advantages & Disadvantages of Programming Languages.

TYPES OF SOFTWARE: System Software, Translators, Compilers, Interpreters, Assemblers, Operating System, Linkers, Libraries & Utilities, Application Software, Packaged & Tailored Softwares. Examples of word-processing, spreadsheets, presentation, multimedia, graphics, accounting, statistical analysis, MIS software and other utility software available.

Unit IV

OPERATING SYSTEMS: Introduction, Types of O.S.: Single User, Multi User, Multi Programming, Multi-Tasking, Real Time, Time Sharing, Batch Processing, Parallel Processing, Distributed Processing. File Allocation Table (FAT & FAT 32), NTFS, Drives, files & directory structure and its naming rules, booting process details of DOS and Windows, system files.

Examples of Operating systems prevalent around the world, Windows, Linux, iOS, Android and others. The concept of Open source, its advantages and limitations.

Virus- working principles, Types of viruses, virus detection and prevention, viruses on network, Antivirus software.

Unit V

WWW, Browser, Search Engine, Uses of the Internet, Basic Services of Internet, Difference between website and portal.

Use of computers in communication : Communication Process, Communication types- Simplex, Half Duplex, Full Duplex, Communication Protocols, Communication Channels - Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication, Modulation and Demodulation, Modem - Working and characteristics, Types of network Connections - Dialup, Leased Lines, ISDN, DSL, RF, Broadband ,Types of Network - LAN, WAN, MAN ,Internet, VPN etc., Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies, Components of LAN -Media, NIC, NOS, Bridges, Adaptors, HUB, Routers, Routers, Repeater and Gateways.

Recommended Text books :

1. Computer Today By S.K. Basandra
2. Computer Fundamentals By P.K. Sinha

Reference books:

1. Operating System By Peterson
2. Easy Approach To Computer Course By G.K. Iyer
3. Operating System By Silberschatz Galvin
4. Fundamentals of Information technology , Alexis Leon & Mathews Leon, Vikas Publishing House, New Delhi.

Class	**:**	**BCA I YEAR**
Paper	**:**	**II**
Paper Title	**:**	**English Language Communication**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Grammar :

Parts of Speech, Determiners, Tenses, Sentences : Simple, Compound and Complex, Voice- Active and Passive, Narration. Common Errors.

Unit II

Lexis:

Use of Dictionary and Thesaurus, Vocabulary: Word formation, Synonyms, Antonyms, words with similar and dissimilar meanings, Homophony, Prefixes and Suffixes, Phrases: Noun phrase, verb phrase, adjective phrase, adverb phrase and prepositional phrase.

Unit III

Communication and Language Skills:

Importance of communication, Elements of communication, Skills of communication-- listening, reading, writing and speaking. Verbal and Non-Verbal Communication,
Comprehension, Paragraph writing-its methods and types, Precis Writing, Summary Writing, Note-Making And Note-Taking, Writing minutes & Memos.
Importance of feedback and reporting in business/corporate environment., Business Etiquettes and Mannerisms

Unit IV

Oral Business Communication:

The Oral Channel And Its Use In Business Transactions , Principles of effective communication, Preparing For A Speech- Informal and Formal speech, Writing A Speech On A Given Topic Or For An Occasion ,Writing the Chairman's speech. Preparing for Interviews, Group Discussion and Conferences.
Reports And Proposals : Classification, Importance of reports, Preparing To Write A Report, Features of Effective Report , Types Of Business Reports, Reports of Committees, Sample Reports. Preparing a Proposal. Business Correspondences - Offer, Enquiry, Quotation, Order, Execution, Claim, Complaint and Adjustments.

Unit V

Written Business Communication:

Importance, Concept, Advantages and Disadvantages of written business communication. Need of Business letters. Layout/Structure of A Business Letter, Kinds of business letters. Essentials of an effective business letter, Enquiries, Replies, Orders, Credit and Reference letters. Supply letters, Dunning letters, Sales letters, Circular letters.
Drafting Official letters – rules to be observed for drafting of official letters, writing application for jobs. Preparing CV for job.Modern Forms of Communication—fax, E-Mail, Video Conferencing, International Communication, Adapting to Global business.

Recommended Text Books:

1. Wren and Martin high school grammar, S. Chand Publications
2. Essential Grammer in Use - Raymond Murphy
3. Practical English Usage – Micheal Swan
4. Business Communication- Rai&Rai , Himalaya Publications.
5. Speaking And Writing For Effective Business Communication, Francis Sunderaraj , Macmillan India Ltd.

Reference Books:

1. Business Communication Essentials – Courtland L Bovee
2. Foundations Of Business Communication: An Integrative Approach – Dona Young
3. Business Communication – Sangeeta Magan
4. Professional communication skills- A K Jain, Pravin Sr Bhatia , A M Sheikh, S. Chand Publication.

Class	**:**	**BCA I YEAR**
Paper	**:**	**III**
Paper Title	**:**	**Office Automation Packages And Tools**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

MS Windows: Introduction to MS-Windows; Features of Windows; Various versions of Windows & its use; Working with Windows; My Computer ,Accessories & Recycle bin ; Desktop, Icons and Windows Explorer; Screen description & working styles of Windows; Dialog Boxes & Toolbars; Volume Control, Working with Files & Folders; simple operations like copy, delete, moving of files and folders from one drive to another, Shortcuts & Auto start, Accessories, Windows Settings using Control Panel- setting up common devices using control panel, modem, printers, audio, network, fonts, creating users, internet settings, Start button & Program lists; Installing and Uninstalling new Hardware & Software program on your computer, maintaining user accounts, setting up system date and time.

Office Packages- Office activities and their software requirements, Word-processing, Spreadsheet, Presentation graphics, Database, introduction and comparison of various office suites like MSOffice, Lotus Notes, Star Office, Open Office etc.

Unit II

MS Word : Introduction , Features & area of use. Working with MS Word : Ribbon tabs-Home, Insert, Page Layout, References, Mailings, Review, View. Creating a New Document; Different Page Views and layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features ; Bullets, Numbering, Auto correct, change case, sorting, Printing & various print options.

Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers ; Inserting – Page Numbers, Pictures, Files, Auto text, Symbols ,formula etc.; Working with Columns, Tabs & Indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, printing Envelops & Mailing Labels. Importing and exporting to and from various formats. Working with OPTIONS in MS-WORD.

Unit III

MS Excel: Introduction ,features and area of use; Working with MS Excel.; concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options.

Unit IV

MS PowerPoint: Introduction & area of use; Working with MS PowerPoint: Creating a New Presentation; Working with Presentation; Using Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Design slides using themes, colors, and special effects. Adding special effects to slide transitions. Working with Notes, Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects; Designing &

Presentation of a Slide Show; Printing Presentations, Notes, Handouts with print options. Working with master slides.

Unit V

MS Access : Introduction to database, Relational Database, Database Elements,
Tables, Query ,Opening and Closing Access Interface Window, Different tabs and icons on ribbon, creating a New database in Access, save and open database, Table creation, Database view and Design View. Data Types, Field Properties, Fields: names, types, properties, Data Entry, Add record, delete record, edit text, Sort, find/replace, filter/ select, rearrange Columns.

Recommended Text books:

1. Learn Microsoft Office – Russell A. Shultz – BPB Publication

Reference books:

1. Microsoft Office – Complete Reference – BPB Publication

Class : BCA I YEAR
Paper : IV
Paper Title : Problem Solving And Programming Through C
Compulsory : Compulsory
Max. Marks : Theory - 40 CCE - 10 Total - 50

Unit I

Use of Algorithm for problem solving. Flow Charts - Symbols, Rules for making flow chart. Program Concept and logic development, Algorithm and flowcharts as programming aids, Characteristics of Programs, Various stages in Program Development , Programming Techniques – Top down, Bottom up, Modular, Structured - Features, Merits, Demerits, and their comparative study. Programming Logic- Simple, Branching, Looping, Recursion, Cohesion & Coupling, Program Testing & Debugging & their Tools .

Unit II

Introduction to C language, standard features of C, Structure of a C program. Introduction to C compilers, Creating and compiling C Programs, IDE features of Turbo C compiler, Command line options to compile C program in TC. Keywords, Identifiers, Variables, constants, Scope and life of variables - local and global variable. Data types, Expressions, Operators : Arithmetic, Logical, Relational, Conditional and Bit wise Operators. Precedence and Associativity of Operators, Type conversion. Basic input/output library functions: Single character input/output i.e. getch(), getchar(),putch(), putchar(). Formatted input/output - scanf() and printf() . Library functions : Mathematical & Character functions, Storage classes.

Unit III

Declaration statement, conditional statement : If statement, If.....Else statement, Nesting of If....Else Statement, else if ladder, The ?: operator, Switch statement. Iteration statements: for loop, while loop, do-while loop. Jump statements: break, continue, goto, exit().

ARRAYS : concept of Single and Multi Dimensional arrays, Array declaration and initialization of arrays. Strings : declaration, initialization, string functions.

Unit IV

The need for C functions, User defined and library functions, prototype of functions, prototype of main() function, Calling of functions, Function arguments, argument passing: call by value and call by reference, Return values. Nesting of functions, Recursion, Array as function argument, Command line arguments. Storage class specifiers - auto, extern, static, register.

Unit V

Defining structure, Declaration of structure variable, typedef, Accessing structure members, Nested structures, Array of structure, Structure assignment, Structure as function argument, Functions that return structure, uses of structure, Union.

Pointers- Fundamentals, Pointer declarations, Passing pointers to the functions, pointers and one dimensional array, dynamic memory allocation, Operations on pointers, arrays of pointers.

Concept of debugging. Finding Errors in the programs, error codes and their meanings, Various debugging options in Turbo C compiler. (Debug and Options Menu of the TCC IDE)

File Handling - Defining, opening & closing a file, Functions for processing and creation of files- Reading, Writing, Accessing(tell()) & Seeking(seek()). Access modes-read, write and append.

Recommended Textbooks :

1. “Programming In C ”, by E. Balaguruswamy ,TMH Publications
2. Schaums Outline Series, by Gottfried
3. The C programming Language by Brain W Kernigham and Dennis M Ritchie
4. Y. Kanetkar, “Let us C” by Y Kanetkar, BPB Publications

Reference Books:

1. “C The Complete Reference”, H. Schildt, Tata McGraw Hill
2. Problem solving and program design with ‘C’ by Elliot Koffman
3. Problem solving and programming by Kenneth A Barclay

Class	**:**	**BCA I YEAR**
Paper	**:**	**V**
Paper Title	**:**	**Business Mathematics**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Trigonometry: Angles & their Measurement, Values of Trigonometric Ratios and their Graphical Representations, Height and Distances.

Unit II

Theory of Indices, Definition & Types of Matrices, Elementary Transformation of Matrices, Determinant and Matrices, Special Matrices, Inverse of a Matrix.

Unit III

Frequency Distribution, Histogram, Measure of Central Tendency, Mean, Mode, Median, Standard Deviation.

Unit IV

Ratio And Proportion, Percentage, Commission & Brokerage, Discount, Profit & Loss.

Unit V

Limits & Continuity, Limits of Functions, Infinite Limits, Limits at Infinity, Continuous Function, Differentiation of 1st and 2nd Order, Integration – finite, infinite, addition, subtraction & multiplication.

Recommended Text Books and Reference Books:

1. Business Mathematics BY S.M.SHUKLA.
2. Fundamental of Statistics BY ELHANCE & ELHANCE.
3. Mathematical Statistics BY H.S.SHARMA
4. Differential & Integral Calculus BY RAY & SETH Matrices BY RAY & SETH.

Class	**:**	**BCA I YEAR**
Paper	**:**	**VI**
Paper Title	**:**	**Digital Computer Organization**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Data Representation: Number System: Binary, Octal, Hexadecimal, Conversions from one base to another, Binary Arithmetic, Unsigned binary number, signed magnitude number, Fixed-point and Floating point representation of numbers, BCD Codes, ASCII code, EBCDIC, Unicode,excess-3 code and gray code, 2's complement arithmetic.

Unit II

Binary Logic: Boolean algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions, SOP and POS form, Karnaugh Maps.

Digital Logic gates: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates–XOR, XNOR, NAND, NOR, Multilevel NAND and NOR circuits.

Combinational Circuits: Half-Adder, Full-Adder, Subtractor, Encoders, Decoders, Multiplexers, De-multiplexers, Sequential Circuits: Flip-flops-RS, D, JK, T & Master-Slave flip-flops, Registers, Counters.

Unit III

Memory: Memory cells - SRAM and DRAM cells, Primary memory-RAM, ROM, PROM, EPROM, PLA programmable logic array, Secondary memory and its types, Internal Organization of a memory chip, Organization of a memory Unit, Concept of cache memory, Organization and levels of cache memory, Concept of virtual memory, memory accessing methods: serial and random access.

Hardware support for memory management.

Unit IV

Bus, word length, processing speed, microprocessor, General architecture of CPU, Instruction format, Instruction set: data transfer instructions, Data manipulation instructions, program control instructions. Von Neumann model.

Types of CPU organization: Accumulator based, stack based and general based machine, Addressing modes. Basic introduction to CISC/RISC.

Unit V

Data transfer modes : Serial, Parallel, Ethernet, USB, Wi-Fi, Bluetooth;

Data transfer scheme (1) programmed data transfer-Synchronous, Asynchronous and Interrupt driven data transfer scheme, (2) Direct memory access data transfer.

Recommended Text books :

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. Computer Fundamentals and Architecture by B.Ram.

Reference books :

1. W. Stallings, "Computer Organization and Architecture - Designing for Performance
2. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
3. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill,

Class	**:**	**BCA I YEAR**
Paper	**:**	**VII**
Paper Title	**:**	**Accounting and Financial Management**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Purpose of Accounting and Uses of Accounting Information ,The basic Financial Accounts, types of accounts, Rules of Entries of transaction, Journal. Cash Book – Types, Format of Cash book, Balancing of Cash Book, Subsidiary books – Purchase, Sales, Purchase return and sales return. Ledger, posting of entries. Double Entry book-keeping.

Unit II

Trial Balance, Rectification of errors, adjustment entries. Depreciation and Inflation. Valuation of Assets and Depreciation Methods: Straight Line Method, Diminishing Balance Method, Sinking Fund Method, Insurance Method and Annuity Method.

Unit III

Preparation of Financial Account: Trading Account, Profit and Loss Account and Balance Sheet.

Unit IV

Finance function and its objectives, tools for financial analysis, capitalization, over capitalization analysis under capitalization.

Unit V

Ratio analysis, funds flow and cash flow analysis, Meaning Interpretations of ratio, classification of ratio.

Recommended Text books:

1. Dr. S P Gupta, Management Accounting
2. I. M. Pandey, Financial Management
3. Financial Management by Khan and Jain
4. Management Accounting by Shashi K Gupta
5. Financial Accounts by S M Shukla

Reference books:

1. Financial Decision Making by Van Horne & James C
2. Financial Management and Policy by V. K. Bhalla
3. Double entry Book Keeping Accountancy Principles by T. S. Grewal
4. Advanced Accounting by R L Gupta
5. Accounting Principles by R N Anthony and Reece

Lab-I **Max. Marks: 50**

Suggested List of Practicals

I. Office Automation Packages and Tools

a. Using MS Word

1. Create a document and apply different Editing options.
2. Create Banner for your college.
3. Design a Greeting Card using Word Art for different festivals.
4. Create your Biodata and use page borders and shading.
5. Create a document and insert header and footer, page title etc.
6. Implement Mail Merge.
7. Insert a table into a document.
8. Create a document and apply different formatting options.

b. Using MS Excel

1. Design your class Time Table.
2. Prepare a Mark Sheet of your class result.
3. Prepare a Salary Slip of an employee of an organisation.
4. Prepare a bar chart & pie chart for analysis of Election Results.
5. Prepare a generic Bill of a Super Market.
6. Work on the following exercises on a Workbook:
    a. Copy an existing Sheet
    b. Rename the old Sheet
    c. Insert a new Sheet into an existing Workbook
    d. Delete the renamed Sheet.

7. Prepare an Attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student &average of attendance.
8. Create a worksheet of Students list of any 4 faculties and perform following database functions on it.
    a. Sort data by Name
    b. Filter data by Class
    c. Subtotal of no. of students by Class.

c. Using MS PowerPoint

1. Design a presentation of your institute using auto content wizard, design template and blank presentation.
2. Design a presentation illustrating insertion of pictures, Word Art and ClipArt.
3. Design a presentation, learn how to save it in different formats, copying and opening an existing presentation.
4. Design a presentation illustrating insertion of movie, animation and sound.
5. Illustrate use of custom animation and slide transition (using different effects).
6. Design a presentation using charts and tables of the marks obtained in class.
7. Illustrate use of macro in text formatting in your presentation.

d. Using MS Access

1. Create a table "Student" for storing records of 5 students under following columns. Scode, Sname, Result, Sclass.
2. Create a table for storing records of 5 employees for an organization- ECode, EmpName, EmpDesig, EmpDept, EmpSal.
3. Display records of employee of Comp. Dept.
4. Write a query to select records of student table of class B.Com. II.
5. Write a query to display student name and result of pass student.
6. Display record of employee whose salary is greater than 30,000.
7. Create a table in MS Access under these columns:- BookID, BookName, Author, Publication.
8. Delete a record from book table whose BookId = "1001".

Lab-II **Max. Marks : 50**

Suggested List of Practicals

Programming in C

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices.
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation .
7. Write a program for generating Mark sheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series
    1+1/1!+2/2!+3/3!+----------+n/n!
17. Write a program to create a pyramid structure
    *
    **
    ***
    ****
18. Write a program to create a pyramid structure
    1
    12
    123
    1234
19. Write a program to create a pyramid structure

1
22
333
4444

20. Write a program to reverse a string.
21. Write a program to find whether a given string is PALINDROME or not.
22. Write a program to input 10 numbers add it and find it's average.
23. Write a program to generate series
    1+1/2!+1/3!+----------+1/n!
24. Write a program to print table of any number.
25. Write a program to print Fibonacci series
26. Write a program to find length of string without using function.
27. Write a program to perform all arithmetic operations using case statement.
28. Write a program to check entered number is Armstrong or not.

Class	**:**	**BCA II Year**
Paper	**:**	**I**
Paper Title	**:**	**Programming With C++ and Data Structures**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Introduction Procedural Vs Object Oriented Programming, Classes, Object, Data, Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing, Object Oriented Languages, Object Based languages. **Basics of C++:** A Brief History of C++, Application of C++, Compiling & Linking, Tokens, Keywords, Identifiers & Constants , Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator. **Functions In C++:** The Main Function, Function Prototyping, Call by Reference Call by Address, Call by Value, Return by Reference, Inline Function, Default Arguments, Constant Arguments, Function Overloading, Function with Array.

Unit II

Classes & Object: A Sample C++ Program with class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions, Returning Objects, Constant member functions, Pointer to Members, Local Classes. **Constructor & Destructor:** Constructor, Parameterized Constructor, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor, Destructor.

Unit III

Inheritance: Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructor in Derived Classes, Nesting of Classes. Operator Overloading & Type Conversion , Polymorphism, Pointers, Pointers with Arrays C++, Streams, C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output with Manipulators.

Unit IV

Basic Idea of Data Structures: Introduction to Data Structure, Classification, Operations on Data Structure, Dynamic Memory Allocation. **Arrays**: Array Address Calculation, operations on array and its algorithms, Application of Arrays, Limitations, Sparse Matrix. **Stacks:** Introduction, Representation of Stack, Implementation, Applications of stack: Infix, Prefix, Postfix expressions, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix expression using Stack. **Recursion:** Recursive Definition and Processes, Example of Recursion, Recursion Vs. Iteration. **Queues:** Introduction, Representation of Queue, Implementation, Circular Queue, Dequeue, and Priority Queue**.**

Unit V

Linked Lists: Linear List Concept, Linked List v/s Array, Linked List Terminology, Linked List Data Structure, Representation of Linked List in Memory, Types of Linked List: Simple, Circular, Doubly Linked List, Circular Doubly Linked List, Operations on Linked List: Creation, Traversing, Searching, Insert Node (Empty List, Beginning, Middle, End), Delete Node (First, General Case) Count, Sort List.
Introduction to Trees: Tree Terminology, Binary Tree, Types of Binary Tree, Representation of Binary Tree, Binary Tree Traversal (Inorder, Preorder, Postorder), Binary Tree Creation, Expression Tree, Binary Search Tree ,Insertion and Deletion in BST, Graph Terminology.
Sorting & Searching Techniques: Bubble Sort, Selection Sort, Binary search and Sequential Search.

Recommended Text Books :

1. Herbert Schildt,"C++ The Complete Reference"
2. Kanetkar, "Let us C++"
3. E. Balagurusamy, "Object Oriented Programming with C++"
4. Seymour Liptsuz, "Data Structure"
5. Tannebaum, "Data Structure"

Reference Books:

1. Y.P. Kanetkar, "Data Structure through C++"
2. Y. Langsam, M. Augenstin and A. Tannenbaum, ―Data Structures using C and C++, Pearson Education Asia,
3. Stanley Lippman & Lajoi, "C++ Primer"
4. Bjarne Stroustrup, "C++ Programming Language"

Class	**:**	**BCA II Year**
Paper	**:**	**II**
Paper Title	**:**	**Computer Based Numerical and Statistical Techniques**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Computer Arithmetic: Floating Point representation of numbers and operations, normalization and their consequences, pitfalls in computing, errors in numbers.

Solution of algebraic and transcendental equations: Introduction, Bisection method, the method of false position (Regula Falsi), Newton-Raphson method, secant method, their algorithms & comparative study of all the methods.

Unit II

Solution of simultaneous linear algebraic equations: Direct Method: Gauss elimination method, Gauss Jordan Elimination method. Iterative Method: Gauss seidel method, pivoting, Ill-conditioned equations.

Numerical Integration: General quadrative formula for equidistant ordinates, Trapezoidal Rule, Simpson's 1/3 rule, Simpson's 3/8 rule and their algorithms.

Unit III

Interpolation & Extrapolation: Introduction, Finite Differences: Forward Differences, Backward Differences, Interpolation with evenly spaced points: Newton's Forward Difference Interpolation Formula, Newton's backward difference interpolation formula.

Interpolation with Unevenly Spaced Points: Lagrange's Interpolation Formula, Newton's Divided Difference Interpolation Formula.

Unit IV

Numerical Solution Of Ordinary Differential Equations: Introduction, Euler's Method and Algorithm, Euler's Modified Method, Taylor's Series, Picard's Method, Runge Kutta Method of Order 2 and Its Algorithm, Runge Kutta Method of Order 4 and its Algorithm.

Unit V

Correlation & Regression : Correlation, definition, Utility, Types of Correlation, Karl Pearson's coefficient of correlation, Shortcut Method, Step Deviation Method, Merits And Limitations of Karl Pearson's coefficient of correlation, Rank Correlation Coefficient, Its Merits And Demerits.**Regression:** Definition, Utility, Linear Regression lines: Freehand curve method, Method of Least Squares, Line of Regression, Regression Coefficient and its Properties.

Recommended Textbooks:

1. Shastri S.S., ―Introductory methods of Numerical Analysis, PHI.
2. Rajaraman V., ―Computer Oriented Numerical Methods, PHI.
3. Prahlad Tiwari – Numerical Analysis

Reference Books

1. Ray & Harswarup Sharma - Mathematical Statistics
2. H.C. Agarwal - Numerical Methods
3. Gupta & Kapoor – Fundamentals of mathematical statistics

4. Krishnamurthy - Computer based Numerical Algorithm
5. Salvadori - Computer Oriented Numerical Methods

Class	**:**	**BCA II Year**
Paper	**:**	**III**
Paper Title	**:**	**Operating System**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Introduction: Definitions, functions and types of operating system, System components, Operating system Structure, System Calls, System Programs, Interrupts, Microkernel .

Process Management: Process Concepts, Process states & Process Control Block, Process Scheduling: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non- Preemptive) – FCFS, SJF, RR, Priority, Multiple-Processor, Real-Time, Multilevel Feedback Queue Scheduling.

Unit II

Process Synchronization: Critical Section Problem, Semaphores, Classical Problems of Synchronization and their Solutions, Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Memory Management: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation

Unit III

Virtual Memory: concept, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms.

File Management: Concept of File System (File Attributes, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree- Structured, Acyclic-Graph, General Graph), Allocation Methods (Contiguous, Linked, Indexed).

Unit IV

Disk Management: Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery, Security: Security Threats, Protection, Trusted Systems, Windows Security.

UNIX: Introduction to UNIX, UNIX System Organization (the Kernel and the Shell), Files and Directories, Library Functions and System Calls, Editors (vi and ed). Introduction to the Concept of Open Source Software, Linux, Linux Architecture, Linux File System (inode, Super block, Mounting and Un-mounting), Essential Linux Commands, Kernel, Process Management in Linux, Signal Handling, System Call, System Call for Files, Processes and Signals

Unit V

Shell Programming: Types of Shells, Shell Meta Characters, Shell Variables, Shell Keywords, Shell Scripts, Shell Commands, the Environment, Integer Arithmetic and String Manipulation, Special Command line Characters, Decision Making and Loop Control, Controlling Terminal Input, Trapping Signals, Arrays, I/O Redirection and Piping, Vi and Emacs Editors, Find, Shell

Procedures and Reporting, Handling Documents, Changing Process Priority with Nice, Scheduling of Processes at Command, cron, Batch commands.

Process Management and Process Synchronization: Command line argument, Background processes, process synchronization, sharing of data, user-id, group-id, fifos, message queues, semaphores, shared variables, Coding, Compiling, Testing and Debugging. AWK programming – report printing with AWK.

Recommended Textbooks:

1. Abraham Silberschatz and Peter Baer Galvin, ―Operating System Concepts, Addison-Wesley.
2. Harvey M. Deitel, ―An introduction to Operating Systems, Addison-Wesley.
3. Milan Milankovic, ―Operating Systems, Concepts and Design, TMH
4. Sumitabha Das ― Unix Concepts and Applications, TMH.
5. Yashwant Kanetkar ―Unix Shell Progamming, BPB.

Reference Books:

1. William Stallings, ―Operating Systems: Internal and Design Principles, 3rd Edition, PHI.
2. Gary Nutt, ―Operating Systems, A modern Approach, Third Edition, Addison Wesley, 2004
3. Andrew Tanenbaum, ―Modern Operating Systems, Prentice Hall.
4. D.M. Dhamdhere, ―Operating Systems: A Concept Based Approach. Second Edition, Tata McGraw-Hill, 2007.
5. Parata ―Advanced Unix–A Programmer‘s Guide, BPB.
6. Meeta Gandhi, ―The C Odyssey Unix– The Open Boundless C, BPB.

Class	**:**	**BCA II Year**
Paper	**:**	**IV**
Paper Title	**:**	**Web Technology and Application Development using .Net & C#**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

HTML - HTML Introduction, HTML Syntax, Head & Body Sections, Basic HTML Tags, Inserting, formatting, & modifying text, Lists – ol,ul & dl. Inserting images, hyperlinks, internal links. Working with tables: table tags & attributes. Form Controls – text field, textarea, radio button, checkbox, drop down list box, button etc.

Unit II

Cascading Style Sheet – Introduction, merits, types, creating Divs with ID & Classes. CSS backgrounds, border, & box model.

Javascript - Overview, JavaScript vs. Java, Comments, Variables, Alertbox, Prompt & confirm. Expressions: Arithmetic operators, Assignment operators, Logical operators, Expressions and precedence, Statements: If statement, For statement, While statement, Break/Continue, Functions.

Unit III

ASP.Net - Overview ofASP.NET framework, Installation of **Visual Studio**, ASP.NET Standard Controls & **Code in C#** for – Labels, Text box, Button, Link Button, Radio Button, Radio Button List, Check Box, Check Box List, Calendar control, Adrotator Control, File upload control. Running a web application, creating a multi-form web project.

Unit IV

State management: Client side- Cookies, query string, hidden fields. Server Side-View state, Session state, Application state.

Form Validation: Client side validation, server Side validation, Validation Controls: Required Field, Comparison, Range, Regular Expression validator, validation summary and custom validation.

UnitV

Database Connection: SQL Server Database File, Configuring SQL Data Source Control, Connection Class, Command Class, Data Adapter Class, Dataset Class. Displaying data in data bound Controls and Data Grid.

Recommended Textbooks:

1. Black Book , "ASP.NET 4.5, Covers C# and VB Codes" , Dreamtech press
2. Matthew Macdonald , "ASP.NET: The Complete Reference" , McGraw-Hill

3. Imar Spaanjaars, “Beginning ASP.NET 4.5 in C# and VB”, Wrox

Reference Books:

4. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, “Mastering HTML, CSS & Javascript Web Publishing” , BPB Publications
5. Thomas A. Powell , “ HTML & CSS: The Complete Reference” , McGraw Hill
6. Black Book , “Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book: HTML, Javascript, PHP, Java, Jsp, XML and Ajax” , Dreamtech press

Class	**:**	**BCA II Year**
Paper	**:**	**V**
Paper Title	**:**	**RDBMS Concepts & Oracle**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Introduction: Evolution of DB and DBMS, need for Data Management, Introduction and Application of DBMS, File System versus Database System. **Concepts of DBMS:** Data, Information, Database, Components of DBMS, Architecture of a database system – Physical, Conceptual and User level, Data Independence – Logical and Physical, DBMS terminology, Data Dictionary.

Concepts of Multitier Architecture in databases, Brief idea about distributed databases, parallel databases, mobile databases, temporal databases, spatial databases, geographic databases, data warehousing, data mining, data visualization, OODB and XML Databases, Multimedia and Web Databases.

Unit II

Database Models: Network, Hierarchical and Relational Models, Features and Comparison of the three models.

RDBMS: Introduction to Relational Database, Structure of Relational Database, Relational Model terminology- domains, Attributes, Tuples, Relations, Relational DB Schema, ER-Model, ER-Diagram, ER-concepts, and types of relationships. Codd's 12 Rules.

Normalization: Functional Dependency, definition, Trivial and Non-Trivial Functional Dependencies, Steps involved in Normalization, 1NF, 2NF, 3NF, Decomposition using Functional Dependency preservation, BCNF, Multi-valued Dependency, 4NF, Join Dependency, 5NF.

Unit III

Idea about Generalization, Aggregation, Specialization.

Indexing & Hashing: Basic Concepts, Indexing: b+ tree & B- tree index files, Hashing: static & dynamic hashing**. Elementary Concepts of Database Security:** System failure, Backup and Recovery Techniques, Authorization and Authentication. **Relational Algebra:** Formal Definition, Fundamental Operations – Select, Project, Union, Set, Difference, Cartesian Product & Rename, additional operations & extended operations.

Unit IV

Concept of SQL sublanguages – DDL, DML, DCL, TCL, SCL etc., Embedded SQL.

Interactive SQL: Oracle data types, table creation, modifying the structure of tables, dropping and renaming tables. **DML commands:** Insertion, updation, deletion operations, many faces of select command, data constraints, logical operators, range searching, pattern matching, oracle functions, use of Alias, grouping data from tables, manipulating dates in SQL.

Unit V

Joins: Equi Join, Self Join, Cross Join. Sub queries, Indexes, Views, Sequences, Roles, Synonyms. **TCL Commands:** use of Savepoint, Rollback, Commit Commands. **DCL**

Commands: creating user accounts, Granting Permissions, Revoking Permissions. Concept of Importing and Exporting Database files.

Recommended Text Books :

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, “Database System Concepts” McGraw Hill
2. Rajesh Narang “Database Management System” PHI

Reference Books

1. C.J. Date , “An introduction to database system ”
2. Bipin C. Desai, “An Introduction to Database System” .
3. Ramakrishnan Gehrke , “Database management system”.

Class	**:**	**BCA II Year**
Paper	**:**	**VI**
Paper Title	**:**	**Software Engineering**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Introduction to Software Engineering: Introduction to Software, Types of software, Software Components, Software Characteristics, Software Engineering , Scope and necessity of Software Engineering, Software Engineering Processes, Factors affecting Quality and Quantity of Software. Software Development Life Cycle (SDLC), **Software Models:** Water Fall Model, Prototype Model, RAD Model, Evolutionary Development Models (Spiral Model, Incremental Model Concurrent Development Model)

Software Requirement Analysis: Requirement Specifications: Need for SRS, Nature of SRS, Characteristics, Components of SRS. Requirements analysis: Review and Management of User Needs, Feasibility Study, Information Modeling, IEEE Standards for SRS, Various SRS Templates, Validation of SRS.

Unit II

Software Metrics and Measurement: Software Process and Project Metrics, Software Measurement, Cyclomatic Complexity Measures: Control Flow Graphs, Software Quality Matrices. **Software Project Planning:** Objectives, Scope, Software Cost Estimation: Decomposition Techniques: Software sizing , Problem Based Estimation, Line of Code(LOC) Vs Function Point (FP) Based Estimation, Process Based Estimation; Empirical Estimation Models: The COCOMO Model; Make/Buy Decision, Software Risk Management.

Software Analysis : Analysis Model, Process and various Documents. **Conventional Analysis:** Data Modeling (ER Diagram), Functional Model & Information Flow (DFDs), Behavioral Modeling, Structured Analysis, Data Dictionary. **Object Oriented Analysis:** Domain Analysis, Object Oriented approach Process (Use Case), Object-Relational Model, Object- Behavioral Model.

Unit III

Software Design: Conventional Design: Design Process, Principles & Concepts, and Design Model. **Object Oriented Design:** Design Issues, Design Process: System Design, Object Design. **Software Design Document:** Software Design Document & its various example templates: Data Design, Architecture Design, and Interface Design & Procedural Design. **Coding:** Code Debugging**,** Verification and Code Optimization.

Testing, Deployment & Maintenance: Objectives, Types of Software Testing, Testing for Functionality and Performance, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suite Preparation, Levels of Testing: User, Integration, System Alpha and Beta Testing, User Acceptance of Products, Roll out of Software & Deployment Issues. Need for Maintenance, Categories of Maintenance: Corrective, Preventive, Adaptive and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering, Software Reuse.

Unit IV

Introduction to Software Project Management (SPM): Project stakeholders, Project management knowledge areas, Project management tools and techniques, Project success factors;

The Role of the Project Manager: Job description, Skills for project manager, Ethics in Project Management, Project Management Software. Project Integration Management . Project Execution, Monitoring and Controlling the Project.

Project Time Management: Importance of Project Schedules and Time Management, Activity Definition, Activity Sequencing, Activity Resource Estimation, Activity Duration Estimation, Schedule Development, Gantt Charts, Critical Path Method (CPM), Program Evaluation and Review Technique (PERT) **Project Cost Management:** Importance and Principles of Project Cost Management, Cost Estimation, Types of cost estimates, Cost estimation tools and techniques, Cost Budgeting, Cost Control, **Project Quality Management:** Importance of Project Quality Management, Quality planning, Quality assurance, Quality control, Tools and Techniques for Quality Control, Pareto analysis, Statistical sampling, Testing, ISO standards for quality, Cost of Quality.

Unit V

Project Human Resource Management: Motivation theories, Maslow‘s hierarchy of needs, Improving effectiveness, Human Resource Planning, Project organizational charts, Responsibility assignment matrices, Management plans and resource histograms, Acquiring the Project Team, Resource assignment, Resource loading, Resource leveling, Developing the Project Team, Managing the Project Team.

Software Configuration Management (SCM), Software Version Control. Software Quality Management**,** Software Quality Assurance (SQA), Software Reliability & Reliability Models, Clean Room Software Engineering Approach. **CASE Tools:** Overview of CASE Tools Framework, Features, Advantages and Limitations of CASE Tools, Awareness about Some Commercial CASE Tools Use and Applications.

Recommended Text Books :

1. R. S. Pressman, ―Software Engineering: A Practitioners Approach, McGraw Hill.
2. Pankaj Jalote ―Software Project Management In Practice, Pearson Education
3. Pankaj Jalote, ―Software Engineering, Wiley.

Reference books:

1. Rajib Mall - Fundamentals of Software Engineering, PHI Publication.
2. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, ―Fundamentals of Software Engineering, PHI Publication.
3. Ian Sommerville, ―Software Engineering, Addison Wesley.

Class : BCA II Year
Paper : VII
Paper Title : Organizational Behavior
Compulsory : Compulsory
Max. Marks : Theory - 40 CCE - 10 Total - 50

Unit I

Fundamentals of OB : Definition, Scope and importance of OB, Relationship between OB with other disciplines –Psychology, Sociology, Anthropology and Political science. Challenges and Opportunities for OB.. Theoretical framework and models of OB (cognitive, behavioristic and social cognitive).

Unit II

Individual Differences and Behavior: Foundations of individual behavior: Biographical Characteristics, Ability and learning. Attitudes, Values and Job Satisfaction. Attitude: Importance of attitude in an organization, Measuring Attitude, Components of attitude, Relationship between behavior and attitude.

Importance of Values and Ethical behavior. Job satisfaction: Concept and measurement. Concept of

Personality and Emotions. The Big Five personality model, Significant personality traits suitable to the workplace (personality & job –fit theory), Emotions, Emotional Intelligence. Developing Emotional Intelligence at the workplace. Perception: Meaning and concept of perception, Factors influencing perception, Motivation: Definition & Concept, Theories of Motivation (Maslow's Need Hierarchy & Herzberg's Two Factor model Theory). The Process Theories (Vroom's expectancy Theory & Porter Lawler model). Contemporary Theories- Equity Theory of Work Motivation.

Unit III

Group Behaviour and Interpersonal Influence: Foundation of Group Behavior: The Meaning of Group, Group behavior & Group Dynamics, Types of Groups, The Five –Stage Model of Group Development. Managing Teams: Work teams In Organization, Developing Work Teams, Team Effectiveness & Team Building, Managing Conflict and Negotiation- Conflicts in Organizations, A contemporary perspective on intergroup conflict, What causes intergroup conflict, The causes of dysfunctional intergroup conflict, Managing intergroup conflict through Resolution, Stimulating Constructive intergroup conflict, Negotiations- Negotiation tactics, Increasing negotiation effectiveness. Assertive Behaviour- Interpersonal Orientations, Facilitating smooth relations, Stroking.

Job stress: Concept of Stress, Stress model, Work stressors, Stress outcomes, Stress moderators, Stress prevention and management, Employee counseling, Types of counseling.

Unit IV

Organization System and Processes:

Communication - The importance of communication, The communication process, Communicating within organizations, Information richness, How technology affects communication, Interpersonal communication, Multicultural communication, Barriers to

effective communication, Improving Communication in organizations, Promoting ethical communications.

Decision Making - Types of decisions, A Rational Decision-making Process, Alternatives to Rational Decision making, Behavioral influences on decision making, Group decision making, Creativity in group decision making.

Leadership - Concept of Leadership, Styles of Leadership, Traits Approach, Contingency leadership Approach, Contemporary leadership, meaning and significance of contemporary leadership, Contemporary issues in leadership, Contemporary theories of leadership, Concept of Transformational leadership, Multicultural leadership, Success stories of today's Global and Indian leaders.

Unit V

Organizational Design, Change And Innovation : Designing an organizational structure, Division of labour, Delegation of authority, Departmental biases, Span of control, Dimensions of structure, Organizational design models, Multinational Structure and Design, Virtual Organizations.

Organizational Culture: Meaning & Definition of Organizational Culture, Creating & Sustaining Organizational Culture. Types of Culture (Strong vs. Weak Culture, Soft vs. Hard Culture & formal vs. Informal Culture), Creating Positive Organizational Culture, Concept of Workplace Spirituality.

Organizational behaviour across cultures, Conditions affecting multinational operations, Managing International Workforce, Productivity and cultural contingencies, Cross cultural communication.

Organizational Change: Meaning, definition & Nature of Organizational Change, Types of organizational change, Forces that acts as stimulants of change, Implementing Organizational Change : How to overcome the Resistance to Change, Approaches to managing Organizational Change , Kurt Lewin's- Three step model, Seven Stage model of Change & Kotter's Eight Step plan for Implementing Change, Leading the Change Process, Facilitating Change, Dealing with Individual & Group Resistance, Intervention Strategies for Facilitating Organization Change, Methods of Implementing Organizational Change, Developing a Learning organization, Organizational Development: Concept and Techniques of OD. The future of Organizational Behaviour.

Recommended Text Books:

1. Organizational Behaviour by Robins
2. Organizational Behaviour by Nelson & Quick
3. Organizational Behaviour by Fred Luthans

Reference books:

1. Organizational Behaviour –Niraj Kumar
2. Organizational Behaviour by Stephen Robins, Timothy Judge, Neharika Vohra
3. Organizational Behaviour by M N Mishra
4. Organizational Behaviour by K Ashwathappa

Supplementary Reading Material

1. Contemporary Leadership Theories: Enhancing the Understanding of the complexity, subjectivity and dynamic of leadership by Ingo Winkler
2. Organizational Performance in a Nutshell by Daniel M.Wentland

Lab I
Max.Marks:50
Suggested List Of Practicals

I. (A) C++ Programming

1. Write a program to convert decimal (integer) number into equivalent binary number.
2. Write a program to print Fibonacci series.
3. Write a program to find factorial of a given number using recursion.
4. Write a program to swap the contents of two variables with functions value parameters, address parameters and pointer parameters.
5. Write a program to check given string is palindrome or not.
6. Write a max function which accepts two numbers and find the maximum of two numbers. The two given numbers can be integer, float, or double so that the functions may call the overloaded functions.
7. Write a program to perform multiplications of two matrices.
8. Write a program to design a class distance with feet and inches as data members. Use a data function to set and show the distance.
9. Write a program to design a class with length and height as data member. Use a data function to get value of length and height from the keyboard and display area of right angle triangle.
10. Write a program to overload the binary operator to add two complex numbers.
11. Write a program to find the area and volume of a rectangular box using constructor.
12. Write a program to design a class time with hours, minutes and seconds as data members. Use a data function to perform the addition of two times objects in hours, minutes and seconds.
13. Write a program to implement single inheritance.

I. (B) Data Structures

1. Write a program to traverse an array.
2. Write a program to insert item at k^{th} position in an array.
3. Write a program to delete k^{th} position item from array.
4. Write a program to push and pop operations on a stack using array.
5. Write a program to insert and delete operation on a queue using array.
6. Write a program for selection sort.
7. Write a program for bubble sort.
8. Write a program for linear (sequential) Search.
9. Write a program for binary search.
10. Write a program to implement linked list.

II. Implementation of Numerical and Statistical Methods

1. Write a program to implement Bisection Method.
2. Write a program to implement False Position Method.
3. Write a program to implement Newton Raphson Method.
4. Write a program to implement Trapezoidal Rule.
5. Write a program to implement Simpson's 1/3 Rule.
6. Write a program to implement Simpson's 3/8 Rule.
7. Write a program to implement Lagrange's interpolation formula.
8. Write a program to implement Euler's method.

9. Write a program to implement Runge Kutta Method of order 2.
10. Write a program to implement Runge Kutta Method of order 4.
11. Write a program to implement Karl Pearson's Coefficient of Correlation.

Lab II **Max.Marks:50**

Suggested List Of Practicals

A. SQL

1. Create tables named Employee, Department, Salary. Implement all DDL commands on it.
2. On the Employee Table use the many faces of SELECT command.
3. On a table perform WHERE CLAUSE, HAVING, GROUP BY, ORDER BY, IN, NOT IN, BETWEEN
4. Create a Database implementing Primary and Foreign Key.
5. Implement I/O Constraints and Business Rule constraints on the database created as in 4 above.
6. Perform Nested Queries on table STUDENT.
7. Perform different types of JOINS on any two tables.
8. Create VIEWS, SEQUENCES and SYNONYMS on a table.
9. Use of SAVEPOINT, ROLLBACK and COMMIT command.

B. Web technology

I. HTML, CSS and Javascript:

1. Design a home page which displays information about your college department using paragraph and list tags, apply basic formatting, insert images also.
2. Create hyperlinks in home page connecting it to 3 different pages. Also, create 3 hyperlinks in home page, which jump to 3 different headings on the same page.
3. Design a timetable and display it in tabular format. Implement CSS backgrounds and borders in the page.
4. Design a Registration form in HTML using HTML forms. Apply CSS on web page and various form controls.
5. Implement javascript validation on a sign-up form.
6. Design a web-page whose content can be changed using JavaScript events.
7. Write a html code inserting javascript to create a basic calculator.

II. .Net & C#

1. Design & code an .aspx web form using textbox, label and button control to calculate simple interest.
2. Design a program in ASP.Net to print student's grade based on the following criteria(using nested if) :
   1)Grade A – percent>=75 2)Grade B – percent >=60 and <75 3) Grade C – for others
3. Calculate factorial of number using for and while loop
4. Calculate gross salary of an employee based on options selected from the check box list. Options are using checkbox list:
   1)HRA, 2)DA and 3)PF
5. Write a program using radio button list control to change the colour of a label, and use check box list control to change the bold, italic and underline styles of that label .

III. Mini Project using Visual Studio

Create a sign-up form(in 70% width of body)which takes data through text-fields, radio-buttons, check-boxes, drop-down list, calendar control etc. Apply various types of validation through validation controls and then fill that data into a table of a SQL Server Database File. Make space for Advertisements in 30% body and display ads using adrotator control.

Class	**:**	**BCA III YEAR**
Paper	**:**	**I**
Paper Title	**:**	**Computer Networking & Internet Security**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

Definition and concept of networking ,transmission modes, transmission media, Internetworking, connecting devices, Adapters, Brouters, evolution of Network Technology, Standards and protocol, Introduction to Analog signal, Digital signal, Modulation and Demodulation. OSI Reference Model-Layered architecture, function of each layer, protocol used.

Unit II

Switching-Message, Packet, and Circuit Switching, Multiplexing - FDM, TDM, WDM, SONET, Cellular network, satellite network, IEEE 802 STANDARDS-CSMA/CD, TOKEN BUS, TOKEN RING, FDDI,. Routing algorithms – Distance Vector routing, Link state routing, TCP/IP- Overview, Architecture, functions of each layer and protocol, IP addressing, subnet and subnet mask, IP addressing-classes, IPV4, IPV6.

Unit III

Bootstrap protocol, DHCP, mobile IP, DNS, Telnet, SMTP, HTTP, SNMP ,TFTP. ATM network, ATM Architecture, BISDN reference model, ATM applications, Data link control - Line discipline, Flow control, Error control. Conventional Encryption – Convention Encryption: Conventional Encryption Model, Steganography, Classical Encryption Techniques, Simplified DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

Unit IV

Cryptography, Public key encryption and hash functions –public key cryptography, principles of public key cryptosystems, The RSA algorithm, Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes, MAC Algorithm, Hash Function algorithms, Secure Hash Algorithm (SHA-1,SHA-256, SHA-512), IP Security.

Unit V

Network Security at various layers, Secure-HTTP, SSL, PSP, authentication Header, Key distribution protocols, Digital Signature, Digital Certificates, Security protocol, Levels of security, Virus and Worms related threats. Malicious programs, FIREWALL design principles, Wifi, Bluetooth, Infrared.

Textbooks and Reference Books:

1. Forouzan , Data Communication - TMG
2. Tanenbaum, Computer Networks
3. William Stallings, Cryptography and Network Security
4. P S Gill, Cryptography and Network Security
5. Rajnish Agarwal, B Tiwari, Data Communication and Computer Network

Class	**:**	**BCA III YEAR**
Paper	**:**	**II**
Paper Title	**:**	**CORE JAVA**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

History and Features of java, C++ Vs Java, how java works, JAVA Program Structure, Java Virtual Machine concepts, java platform overview, Primitive data types, tokens, variables and constants, operators, precedence, expressions ,statements – branching , looping and jumping , labeled statements.

Unit II

Classes, objects and methods : defining a class, adding variables and methods, creating objects, constructors, Instances, fields and methods initialization by constructors, access methods Arrays , String and String buffer classes , Wrapper classes, using the JDK tools.

Unit III

Inheritance, Super class, Subclass, basic types, using super keyword, abstract and final classes, Method overloading, Interface, Thread, Thread Life cycle, Multithreading examples, Synchronized threading, Priorities of thread.

Unit IV

Exception handling: fundamentals, exception types, uncaught exceptions, throws, throw, try-catch, finally, built in exceptions, creating your own exceptions. Packages, Built in Packages, Creating your own Package.

Input/output-basics-streams, byte and character streams.

Unit V

Applet programming- Local and Remote Applets , Applet Vs Applications creating and executing java applets , inserting applets in a web page , java security, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applet Tag, Getting Input from the User.

Networking –basics, networking classes and interfaces, using java.net package, TCP/IP and datagram programming.

Text books & Reference books:

1. E.Balaguruswamy, "Programming with java" .
2. Schildt, "Java Complete Reference", TMH.
3. Das Rashmikanta, "Core Java", IE, Vikas Publication.
4. Bansal Nitin, Ajit Kumar, "A Simplified approach to Java Programming", KALYANI Publications.

Class	**:**	**BCA III YEAR**
Paper	**:**	**III**
Paper Title	**:**	**Management Information Systems**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total - 50**

Unit I

The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Decision Support System, Interpersonal Communicational System, Physical or Abstract Systems.

Systems Analysis and Design Life Cycle**:** SDLC, Requirements specifications, Feasibility analysis, Final Specifications, Role of System Analyst, Attributes of a Systems Analyst.

Unit II

Systems Analysis: System Planning and Initial Investigation**,** Information gathering tools, Tools used in System Analysis, Data flow diagrams, case study for use of DFD, Leveling of DFDs, Logical and physical DFDs, Structured and Unstructured DFDs, Types of Interviews and

Questionnaires, Data Dictionary, Decision Trees and Structured English, Feasibility Study, Cost/Benefit Analysis.

Systems Design: Logical & Physical Design, Design methodologies, Structured Design, Input/output and Forms Design: Input Design, Output Design, Requirements of form Design, Screen design, graphical user interfaces, interactive I/O on terminals, Specification oriented design vs. Procedure oriented Design, File Organization and Database Design .

Unit III

System Implementation: System Testing and validation, Systems Quality Assurance, Level of Quality Assurance, Implementation and software maintenance, Hardware and software selection, Project Scheduling, System Maintenance: Maintenance activities and issues, Security , Disaster/Recovery Planning, Ethics codes and standards of behavior in system development.

Management Information Systems – Need, Purpose and Objectives – Contemporary Approaches to MIS, Information as a strategic resource – Use of information for competitive advantage – MIS as an instrument for the organizational change.

Unit IV

Management and Decision Making – Models of Decision Making – Classical, Administrative and Herbert Simon‘s Models – Attributes of information and its relevance to Decision Making. Types of information.
Information Technology – Definition, IT Capabilities and their organizational impact, IT enabled services such as Call Centers, Geographical Information Systems etc., Data Base Management Systems – Data Warehousing and Data Mining. Information Security and Control – Quality Assurance -Ethical and Social Dimensions – Intellectual Property Rights as related to IT Services / IT Products – Managing Global Information Systems.

Unit V

Decision Support System – Importance of decision support system, Characteristics of Decision Support System, Computerized Decision Support-Decision Making: introduction and Definitions, Models, Phases of the Decision-Making Process: The Intelligence Phase, Design Phase, implementation Phase, Executive Information Systems – Executive Support Systems – Expert Systems and Knowledge Based Expert Systems – Artificial Intelligence.

Performance Evaluation and monitoring, Model Building, Simulation, Quality Control and Quality Assurance.

Textbooks & Reference Books:

1. Laudon and Laudon, ―Management Information Systems, Pearson Education Asia.
2. Jawadekar, ―Management Information Systems, Tata McGraw-Hill.
3. Elias M. Awad, "System Analysis and Design"

4. Perry Edwards, "System Analysis and Design"
5. I.T. Haryszkiewycz, "Introduction of System Analysis and Design" , PHI
6. Davis and Olson, ―Management Information Systems, Tata McGraw-Hill.
7. Turban and Aronson, ―Decision Support Systems and Intelligent Systems, Pearson Education.
8. O'Brien, ―Management Information Systems, 8/e, Tata McGraw-Hill.
9. Kroenk Hatch,, ―Management Information Systems, Tata McGraw-Hill.
10. Jayant Oke, ―Management Information Systems.
11. Ron Weber, ―Information System Control and Audit.
12. Management Information System- Rakesh Kothari

Class	**:**	**BCA III YEAR**
Paper	**:**	**IV**
Paper Title	**:**	**Python Programming**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total – 50**

UNIT I

Python Basics : Python interpreter, Python idle, dynamically typed and strongly typed features, basic data types, variables, expressions, statements, operators, flow of execution. Input and Output statements, Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration: while, for, break, continue, pass, implementing 'for' through range(), 'in' and 'not in' operators for sequence traversal. Creating and executing .py scripts.

UNIT II

Data Structures: Lists- append**,** extend, insert, index, remove, pop, count, sort, reverse, slicing, list comprehension, Copying a list: deep copy, shallow copy. Tuples- index, count, usage, use of tuples as a swap function. Dictionaries-keys, values, tuples, nested dictionaries, dictionary comprehension. Strings- Single line and multi-line strings, formatter, isdigit, isalpha, isalnum, islower, istitle, isspace, title, lower, upper, strip, split, splitlines, join etc. Sets – union, intersection, subset, superset, difference, symmetric difference, copy, add, remove, discard etc.

UNIT III

Functions & File Handling: Inbuilt Functions- id, len, chr, ord etc., defining and calling a function, arguments, global versus local variables, defining and using lambda functions, the map(), filter(), reduce() functions.

Working with files : read, write and append modes: r, w, a, r+, w+, a+, reading-read(), readline(), readlines(), writing-write(), writelines(), seek(), tell(). Word count, copy file scripts through file handling concepts.

UNIT IV

Classes, modules and exceptional handling: Classes: Introduction, Member variables and defining methods, constructor, destructor, data encapsulation, inheritance, multiple inheritance, diamond problem solving technique of python.

Modules: inbuilt modules- sys, random, time etc. import, from..import, from..import *. Constructing packages, role of __init__.py

Exceptional Handling: The **try-except-else-finally** block, the **raise** statement, the hierarchy of exceptions, adding exceptions.

Unit V

Database & GUI Programming: importing sqlite, connecting to database, creating table, insert, select, update, delete, drop tables, accessing and modifying tables through python.

Graphical user interfaces; event-driven programming paradigm; tkinter module, creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes - sizes, fonts, colors layouts, nested frames.

Textbooks & Reference Books:

1.Taneja Sheetal & Kumar Naveen , “Python Programming: A modular approach”, Pearson
2.Zed A. Shaw , “Learn Python the Hard Way”, Zed Shaw's Hard Way Series
3.Liang Y. Daniel, “Introduction to Programming Using Python”, Pearson
4.Charles Dierbach, “Introduction to Computer Science using Python”, Wiley
5.Michael T. Goodrich, “Data Structures and Algorithms in Python”, Wiley

Class	**:**	**BCA III YEAR**
Paper	**:**	**V**
Paper Title	**:**	**E-GOVERNANCE**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total – 50**

Unit I

Introduction to E-Governance: Needs of E-Governance, Issues in E-Governance applications and the Digital Divide; Evolution of E-Governance, Its scope and content; Present global trends of growth in E-Governance; Other issues.

Models of E-Governance: Introduction; Model of Digital Governance: Broadcasting/ Wilder Dissemination Model, Critical Flow Model, Comparative Analysis Model, Mobilization and Lobbying Model, Interactive-service Model/Government-to-Citizen-to-Government Model (G2C2G); Evolution in E-Governance and Maturity Models: Five Maturity Levels, Characteristics of Maturity Levels, Key areas, Good Governance through E-Governance Models.

Unit II

E-Governance Infrastructure and Strategies: E-readiness: Digital System Infrastructure, Legal Infrastructural Preparedness, Institutional Infrastructural Preparedness, Human Infrastructural Preparedness, Technological Infrastructural Preparedness; Evolutionary Stages in E-Governance.

Data Warehousing and Data Mining in Government: Introduction; National Data Warehouses: Census Data, Prices of Essential Commodities; Other areas for Data Warehousing and Data Mining: Agriculture, Rural Development, Health, Planning, Education, Commerce and Trade, Other Sectors.

Unit III

Cyber Security: Information System Threats and attacks, Classification of Threats and Assessing Damages, Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, Authentication Service Security, Security Implication for organizations, Laptops Security Framework for Information Security, ISO 27001, SEE-CMM, Security Metrics, Information Security Vs Privacy.

Basic Principles of Information Security, Confidentiality, Integrity, Availability and other terms in Information Security, Information Classification and their Roles, Security Threats to E-Commerce, Virtual Organization, Business Transactions on Web, E-Governance and EDI, Concepts in Electronics payment systems, E-Cash, Credit/Debit Cards.

Unit IV

Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.

IT Act & Cyber Laws : Cyber Crime and Cyber Laws, Types of Cyber Crimes, Cyber Law Issues in E-Business Management, Overview of Indian IT Act, Information Technology Act 2000, International Scenario in Cyber Laws: Data Protection Laws in EU and USA, Ethical Issues in Intellectual property rights, Copy Right, Patents, Data privacy and protection, Domain Name, Software piracy, Plagiarism, Issues in ethical hacking.

Unit V Case Studies: Indian Context: Cyber Laws, Implementation in the Land Reform, Human Resource Management Software; India: NICNET, Collectorate, Computer-aided Administration of Registration Department (CARD), Smart Nagarpalika, National Reservoir Level and Capacity Monitoring System, Computerization in Andra Pradesh, Ekal Seva Kentra, Sachivalaya Vahini, Bhoomi, IT in Judiciary, E-Khazana, DGFT, PRAJA, E-Seva, E-Panchyat, General Information Services of National Informatics Centre; E-Governance initiative in USA; E-Governance in China; E-Governance in Brazil and Sri Lanka.

Textbooks & Reference Books:

1. C.S.R. Prabhu, ―E-Governance: Concepts and Case Studies, Prentice-Hall of India Private Limited, 2004.
2. Backus, Michiel, ―e-Governance in Developing Countries, IICD Research Brief, No. 1, March 2001.
3. N. Gopalsamy, ―Information Technology & e-Governance, New Age Publication, First Edition 2009.
4. Godbole,― Information Systems Security, Willey
5. Merkov, Breithaupt,― Information Security, Pearson Education
6. Schou, Shoemaker, ―Information Assurance for the Enterprise, Tata McGraw Hill
7. Sood,―Cyber Laws Simplified, Mc-Graw Hill
8. Indian IT Act 2000-Bare Act Professional.
9. Pavan Duggal, ―Cyberlaw-The Indian Perspective: 2009 Edition with IT Act amendments 2008, Saakshar Law Publications.
10. Farooq Ahmad, ―Cyber law in India, Pioneer Books.
11. Vakul Sharma, ―Information Technology Law and Practice, Universal Law Publishing Co. Pvt. Ltd..
12. Suresh T Vishwanathan Bharat, ―The Indian Cyber Law, Law house New Delhi.
13. P.M. Bakshi & R. K. Suri, ―Hand Book of Cyber & E-Commerce Law, Bharat Law House New Delhi.

Class	**:**	**BCA III YEAR**
Paper	**:**	**VI**
Paper Title	**:**	**Principles And Practices Of Management**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**Theory - 40 CCE - 10 Total – 50**

Unit I

Introduction to Management Concept, Definition and Characteristics; Management as an Art or Science; Objective of business management; Manager: roles and responsibilities, Management Theories and Practices; Core functions of Management.

Unit II

Planning: Introduction (concept, definition and characteristics) ; Types of Planning; significance of planning, Planning versus forecasting, Planning Principles; Planning Process; Factors responsible for failure; Management by objectives.

Unit III

Organizing: Introduction (concept, definition and characteristics), Organizing Process and its importance; Span of Management; Organizing Principles; Line and staff relationship(s); Delegation of Authority, Departmentation; Centralization and decentralization.

Unit IV

Directing: Introduction, Components of Directing; Principles of Directing; Directing Styles; Tools for Directing. Leadership: styles and importance.

Controlling: Introduction, Control process; Types of control, Controlling Principles and Techniques; Resistance to control- effects and ways to overcome resistance; Controlling by Exception.

Unit V

Coordinating: Introduction, Elements of coordination, Principles of coordination; Approaches of coordination.

Staffing: Introduction; Roles and responsibility of staffing; Staffing process; Factors affecting staffing process.

TEXT BOOKS & REFERENCE BOOKS:

1. Haroid Koontz, O'Donnel and Heinz Welhrich, 'Principles of Management', McGrawHill Co
2. R.D. Agarwal , 'Organization and Management Concepts', Tata McGraw Hill.
3. Newman and Warran, 'The process of management: concepts, behavior and practices', PHI
4. S M Shukla, 'Principles of Management', Sahitya Bhawan, Agra.
5. Robbins S. P. and Decenzo David, " Fundamentals of Management: Essential Concepts and Applications", Pearson Education,
6. Hillier Frederick S. and Hillier Mark S. - Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, Tata McGraw Hill, 2nd Ed., 2008.

Class	**:**	**BCA III YEAR**
Paper	**:**	**VII (Project)**
Paper Title	**:**	**Application Development using PHP & MySQL**
Compulsory	**:**	**Compulsory**
Max. Marks	**:**	**External Viva - 40 CCE - 10 Total – 50**

Recommendation: The technology to be used for Project Development to be revised every 2 yrs . as per the prevailing trends and needs of the industry/market.

GUIDELINES for Project Development in BCA Final Year.

- **Internal Evaluation (CCE) will be based on viva on project synopsis ((i.) System study and system design, (ii.) Presentation) submitted by the student – 10 marks.**
- **External Evaluation will be based on , Viva and demonstration of the work done in the project– 40 marks**

1. Project will consist of software development taken up in a group consisting of not more than 2 students.
2. Report will be submitted jointly by the group in one copy.
3. Project can be done either as on-the-job training in a software development organization/company or it can be a self effort as a suitable solution to a real world problem identified in consultation with guide teacher.

GUIDELINES FOR PROJECT FORMULATION

*** TYPE OF PROJECT**

It is **suggested** that the project to be chosen should have some direct relevance to the real world. Students are expected to work out a solution for real life problems involving diverse application domains in some industry / development laboratories / educational institutions / software companies. However, it is not mandatory for a student to work on a live project. The student can formulate or innovate a project problem with the help of his/her Guide.

The project work will give an opportunity to the students to develop quality software solutions. Project development should involve all the stages of the software development life cycle (SDLC)

like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, and develop good understanding of SDLC.

Project Ethics to be adhered to: Plagiarism to be avoided: The project should be genuine and original in nature and should not be copied from anywhere . Students should be encouraged to work in the suggested areas listed at the end of the guidelines.

***Calendar For The Project**

Sr. No.	Topic	Date
1	Assigning of teacher guide	Before 25/July
2	Topic Finalized	Before 20/August/
3	Submission Of the Project Abstract And Synopsis (**CCE 1**)	Before 20/September/
4	PPT Presentation **(CCE 2)**	Before 20 /December/
5	First proof of the Project Report to be checked by teacher guide	Before 20/February/
6	Final Submission and Viva/demonstration by external examiner	2nd week of March

*** PROJECT PROPOSAL (SYNOPSIS)**

The project proposal should be prepared in consultation with the mentor in organisation / teacher guide. The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project proposal should contain complete details in the following form:

1. Title of the Project
2. Introduction and Objectives of the Project
3. Relevance of the topic for the benefit of the society
4. Analysis :(DFDs at least up to second level , ER Diagrams/ Class Diagrams/ Database Design etc. as per the project requirements).
5. Design: A complete structure which includes: Number of modules and purpose of each module to provide an estimation of the student's effort on the project. Data Structures as per the project requirements for all the modules.

6. Testing process to be used.
7. Reports generation (Mention tentative content of report)
8. Tools / Platform, Hardware and Software Requirement specifications
9. Are you doing this project for any Industry/Client? Mention Yes/No. If Yes, Mention the Name and Address of the Industry or Client
10. Future scope and further enhancement of the project.

Incomplete project proposals in any respect should be given another chance and re-submitted after incorporating changes and suggestions given by the guide. CCE marks to be given based on synopsis viva.

*** PROJECT REPORT FORMULATION**

I. The project report must contain the following in detail :

1. Certificate from the organization where project has been undertaken.
2. Certificate of Originality (Format given).
3. Declaration(Format given).
4. Acknowledgement (Format given).
5. Introduction
4. Objectives
5. Tools/Environment Used
6. Analysis Document (This should include SRS in proper structure based on Software Engineering concepts, E-R diagrams/Class diagrams/any related diagrams (if the former are not applicable), Data flow diagrams/other similar diagrams (if the former is not applicable), Data dictionary)
7. Design Document (Modularization details, Data integrity & constraints including database design, Procedural design, User interface design)
8. Program Description (Detailed specification instead of code), Comments & Description.)
9. Testing (Test case designs are to be included separately for Unit testing, Integration testing, System testing; Reports of the outcome of Unit testing, Integration testing, System testing are to be included separately. Also, details of debugging and code improvement are to be included.)
10. Input and Output Screens
11. Implementation of Security for the Software developed (In case, you have set up a User Name and Password for your software, you should ensure the security of User Name and Password during transmission to server)
12. Limitations, future scope for improvement/enhancement of the Project
13. Application of the project mentioning benefit to the real world
14. Bibliography/ References
15. Synopsis

II. The Project Report may not be more than 80 1.5mm spaced A-4 size typed pages .

III. Executable file of the project must be submitted in soft copy attached at the back of the project report.

IV. The project report should be hard bound; should consist of a Contents page; all pages of report should be numbered; content should be well organized in a meaningful manner; printouts of text & screen layouts should be original and should not be xeroxed)

***Important Points For Preparation & Submission of the Project Report**

1. The Project Report should be submitted in A-4 size typed in 1.5mm line space, justified. (Font Times New Roman, size normal 12 , Heading 16 and Subheading 14)
2. The length of the report should be between 50 to 80 pages including the cover page, summary, table of contents, list of figures, list of tables, and acknowledgement.
3. Ensure that Project Synopsis and the final report contain the signatures of both the Guide and the student along with date.
4. If any project report is received in the absence of the items listed above, it will be rejected and returned to students for compliance. Also, violation of Project Guidelines may lead to rejection of the Project .
5. Spiral bound photocopy of the project report is to be submitted to the College. Original copy of the same Project Report is to be retained with the student and the student is supposed to carry his copy while appearing for viva voce.
6. If the title and content of the Project differs from the title mentioned in the Project Proposal, the Project Report should be rejected by the external examiner and valuation to be done accordingly.

***Suggested list of topics for Application Development**

A sample list of topics for Project development is provided below. This is just a

suggested list and students are free to choose any other innovative project relevant to computer applications **which can be developed using PHP/ MySQL.**

- Customer Targeted E-Commerce
- Automated Faculty Evaluation System
- Online Health Shopping Portal With Product Recommendation
- College Forums with Alumni With Content Filtering
- Sql Injection Prevention System
- College Social Network Project
- ERP System
- Online Book Recommendation Using Collaborative Filtering
- Monitoring Suspicious Discussions On Online Forums
- Fake Product Review Monitoring & Removal For Genuine Ratings
- A Commodity Search System For Online Shopping Using Web Mining
- Secure Online Auction System
- Farming Assistance Web Service

- Online Loan Application & Verification System
- Matrimonial Portal
- Online Herbs Shopping Project
- Online Bakery Shop System
- Course Material Distribution System
- Online Furniture Shop Project
- Hotel Room Comparison System Project
- Salon management System
- Sports Club Management Project
- Online Blood Bank Project
- Stationery Management System
- Online Application for the Training and Placement
- Online Leave Management System
- Airline Reservation System
- Recipe Management System
- Complaint Management System
- Web Based Meeting Scheduler
- Student Project Allocation And Management
- Ticket Reservation System
- Content Management System
- Call Center Management
- Online On-Request Courses Coordination System
- Civil Registry
- Online Career Guidance and Placement Unit
- Ad Agency

*** Formats of certificates to be included**

A. Cover page:.

PROJECT REPORT

On

<Project Title>

SUBMITTED TO

Barkatullah University

B. Certificate from the organization : (to be issued by the organization and the photocopy of the certificate is to be attached in the report)

C. Format for acknowledgement

ACKNOWLEDGEMENT

I convey my sincere gratitude to _____ _____ for giving me the opportunity to prepare

my project work in _____. I express my sincere thanks to all the staff members of _____.

I am thankful to _____ for her/his guidance during my project work and

sparing her/his valuable time for the same.

I express my sincere obligation and thanks to the Principal and all Faculties of the Department of_____, _____, for providing me with guidance, help, motivation and valuable advice at every stage for completing the project work successfully.

Signature:

Name:

Roll No:

D. Format for Declaration

DECLARATION

I do hereby declare that the project work entitled "_____" submitted by me for the partial fulfillment of the requirement for the award of Bachelor of Computer Applications, is an authentic work completed by me. The report being submitted has not been submitted earlier for the award of any degree or diploma to any Institute or University.

Date:

Signature :

Name:

Roll No:

E. Certificate of Originality

CERTIFICATE OF ORIGINALITY

This is to certify that the project report entitled _____ Submitted to Barkatullah University, Bhopal, in partial fulfillment of the requirement for the award of the degree of Bachelor of Computer Applications, is an original work carried out by Mr./ Ms._____. Enrollment No.: _____ Roll.No.…….

The matter embodied in this project is a genuine work done by the student and has not been submitted whether to this University or to any other University / Institute for the fulfillment of the requirement of any course of study.

Signature of the Guide
Name, Designation and
Address of the Guide

Lab I : **Max.Marks: 50**

A. **Core Java Programming (Using any Text editor)**

1. Find greater number between two numbers. Using conditional operator.
2. Find the factorial of number if number is given by user using command line argument.
3. Write a program to check if a number is prime or not.
4. Write a program to display tables from 2 to 10.
5. Write a program to print Fibonacci series.
6. Enter a no. and check whether it is even or odd.
7. Write a Program to find sum & average of 10 no. using arrays.
8. Write a program to display reverse of a digit no. using array.
9. Write a program to display grade according to the marks obtained by the student.
10. Write a program to calculate the salary of an employee if salary is greater than or equal to 20000 and year of service is greater than or equal to 5 years then bonus will be 2000 otherwise 1000 and print grass salary of employee.

11. Write a program to convert the given no. of days into months & days using with classes, objects and method.
12. Write a program to convert given string into Uppercase and lowercase and get the length of string using array.
13. Create a package called "Arithmetic" that contains methods to deal all arithmetic operations. Also write a program to use the package.
14. Define an exception called "Marks out of Bound" exception that is thrown if the entered marks are greater than 100.
15. Write a program using application of single inheritance. Find the area of rectangle & volume of cube.
16. Develop a simple real life application to illustrate the use of multithreading.
17. Write a program using multiple inheritance calculate area and parameter of a circle
18. Write a program which takes input from keyboard and sends output to the console
19. Write an applet program to draw a Rectangle (color = orange) and an right aligned oval.
20. Develop an applet that receives 3numeric values as inputs from the user and then displays the largest no. on the screen.

B. **Management Information System Lab**

1. Identify some Real time Business Domain Problems.
2. Documentations of any one identified Problem (Preparation of Problem statement) by using process Analyst tools for making DFD/ER Diagrams.

Lab II : Max.Marks: 50

PYTHON PROGRAMMING

SUGGESTED LIST OF PRACTICALS

1. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?
2. Print the first 2 and last 3 characters in a given string. Use the string slicing.
3. Write a program that eliminates duplicates in a list.
4. Implement shallow copy and deep copy of a list.
5. Find the largest of n numbers, using a user defined function largest()
6. Write a function that capitalizes all vowels in a string.
7. Read a line containing digits and letters. Write a program to give the count of digits and letters.

8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.
9. Use the list comprehension methodology in python, to generate the squares of all odd numbers in a given list.
10. Generate a dictionary and print the same. The keys of the dictionary should be integers between 1 and 10 (both inclusive). The values should be the cubes of the corresponding keys.
11. Create a nested dictionary. The roll number of a student maps to a dictionary. This inner dictionary will have name, age, and place as keys. Read details of at least three students.
12. Enter a word. Create a dictionary with the letters of this word as keys, and the corresponding ASCII values as values.
13. Define a class with three methods: readString(), printString(), writeString(). The first method should read the contents of a file. The second method should print the contents to the console. The third method should write the contents to a new file.
14. Create a class account which has constructor to input account_no, name, balance from user, print_account() to display the account details, and deposit(), withdraw() which inputs amount and add/subtract them from the total amount of individual object.
15. Create a database table in sqlite and show the table data in python.
16. Implement DML commands in SQLite from python interface.
17. Implement tkinter methods in a python script.