BCA I SEMESTER

MATHEMATICS - I

(For Commerce students only)

Subject Code	BCA 1.1 (A)	IA Marks	30
No. of Lecture Hrs/ Week	52	Exam hours	03
Total no. of lecture hours	04	Exam Marks	70

UNIT-I: (10 Hrs)
Algebra: Theory of indices and logarithms with standard problems. Progressions: A.P, G.P and H.P, Mathematical induction, Binomial Theorem, Partial Fractions.

UNIT-II: (6 Hrs)
Theory of equations: Solution of Quadratic, Cubic and Biquadratic equations.

UNIT-III: (10 Hrs)
Analytical Geometry: Distance formulae, section formulae, shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point slope form, slope-intercept form, two-point form, intercepts form and normal form. General equation of a line. Equation of family of lines passing through the point of intersection of two lines. Distance of a point from a line.

UNIT-IV (16Hrs)
Trigonometry: Measurements of angles, Trigonometric functions of standard angles. Compound angles, Multiple and Sub multiple angles, Transformation formula, Heights and Distances.

UNIT-IV (10 Hrs)
Calculus: Limits, Continuity, Differentiation: Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation.

TEXT BOOKS:
1. B.G. Umarani and P.G. Umarani, , A Text Book of Mathematics for PUC I and II
2. B.M. Sreenivasa Rao, H. K. Venkatesh Bhatta and A. Anantha Rangan,, Excellent series, A Text Book of Mathematics for PUC I and II
3. Bosco S.S, Theory & Problems in MathematicsPUC I & II, BoscoSS Publications, Mangalore.

Scheme of examination:
Theory for 70 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions out of which 5 questions need to be answered. Each carries 12 mark.   (5*12=60 marks)

ACCOUNTING & FINANCIAL MANAGEMENT – I

(For Science/ Diploma/Arts students only)

Subject Code	BCA 1.1 (B)	IA Marks	30
No. of Lecture Hrs/ Week	52	Exam hours	03
Total no. of lecture hours	04	Exam Marks	70

UNIT-I: (8 Hrs)
Introduction: History and Development of Accounting - Meaning, Objectives and functions of Accounting - Book - keeping v/s Accounting - Users of accounting data systems of book - keeping and accounting - branches of accounting - advantages and limitations of accounting. **Accounting Concepts and conventions**: Meaning, need and classification, Accounting standards - meaning, need and classification of Indian accounting standards. Accounting principles v/s Accounting standards.

UNIT-II: (18 Hrs)
Financial Accounting Process: Classification of accounting' transactions and accounts, rules of debit and credit as per Double Entry System. Journalisation and Ledger posting.
Preparation of different subsidiary books: Purchase Day Book, Sales Day Book, Purchase Returns Day Book, Sales Returns Day Book, Cash Book.

UNIT-III : (6 Hrs)
Bank Reconciliation Statement: Meaning, Causes for difference , Advantages, Preparation of Bank Reconciliation Statements.

UNIT-IV: (10 Hrs)
Accounting for Bill of Exchange: Meaning, Need, Definition, Parties to Bill of Exchange, Types of Bill, Accounts Procedure: Honour of the Bill, Dishonour of the Bill, Endorsement, Discounting, Renewal, Bills for collection, Retirement of the Bill, Accommodation Bills, Bills Receivable Book and Payable Bo
Preparation of Trial Balance: Rectification of errors and Journal Proper.

UNIT-V: (10 Hrs)
Preparation of Final Accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance - Sheet of sale- trading and partnership firms.

TEXT BOOK:
1. Kadkol, M.B, Accountancy PUC I & II 20th ed, Renuka Prakashan, Hubli.
<u>Scheme of examination :</u>
Theory for 70 marks: Question paper will consist of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions   out of which 5 questions need to be answered. Each carries 12 mark.   (5*12=60 marks)

C - PROGRAMMING

Subject Code	BCA1.2	Theory exam for 70 marks	Theory paper IA	60 Marks 10 Marks
Total No of Lecture Hrs	52		Theory Exam duration	3 Hrs
No. of Lecture Hrs/Week	04	Practical Exam for 30 marks	Final practical Exam IA	20 Marks 10 Marks
No of practical Hrs/Week	2+2		Practical Exam duration	3 Hrs

UNIT-I: C Programming basics (12 Hrs)

Computer Programming: Basic Programming concepts, Modular programming and structured programming, Problem solving using Computers, Concept of flowcharts and algorithms .

Overview of C: Introduction, Importance of C, Sample C Programs, Basic structure of C programs, Programming style, Executing a C Program.

Constants, Variables and Data types: C Tokens, keywords, and identifiers, constants, variables, datatypes, declaration of variables, assigning values to variables, defining symbolic constants.

Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, increment and decrement operators, conditional operator, bitwise operators, type conversion in expressions, operator precedence and associativity. Mathematical functions.

UNIT II: Input/Output operations and Decision-Making (15 Hrs)

Input and Output statements, reading a character, writing a character, formatted input, formatted output statements.

Decision-making, Branching and Looping : Decision making with IF statement, simple IF statement, The IF-ELSE statement, nesting of IF .. ELSE statements, The ELSE -IF ladder, The switch statement, The ?: operator, The GOTO statement, The WHILE statement, The DO statement, The FOR statement, jumps in loops.

UNIT III: Arrays and Strings (12 Hrs)

Arrays: One dimensional arrays, Two-dimensional arrays, initializing arrays, Programs based on arrays such as sorting, Fibonacci sequence, matrix operations, etc.

Handling of Characters and Strings: Declaring and initializing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together. Comparison of two strings, character and string handling functions.

UNIT IV: Functions (8 Hrs)

User defined functions: Need for user-defined functions, a multi-functional program, the form of 'C' function, Return values and their types, calling a function, category of functions: No arguments and no return values, arguments but no return values, arguments with return values, nesting of functions, recursion, functions with arrays as parameters.

UNIT V: Structures and Pointers (5 Hrs)

Structure and Union: Structure definition, giving values to members, structure initialization; comparison of structure variables, array of structures, array within structure, union.

Pointers: Understanding pointers, accessing the address of variables, declaring and initializing pointers, accessing a variable through its pointer.

TEXT BOOKS:
1. E.Balaguruswamy. : Programming in ANSI C" Tata Me Graw-Hill (1998)
2. Kamthane, Programming with ANSI and Turbo C. Pearson Education 2003
3. Yeshvant Kanetkar: "Let us C"

REFERENCES:
1. V.Rajaraman.: "Programming in C ", PHI (EEE) (2000)
2. Rajesh Hongal : "Computer Concepts & C language"
3. Brain Kernighan & Dennis M. Ritchie "ANSI C Programming" (PHI)

COMPUTER LAB-1 (BASED ON BCA1.2)

C Programming:
1) Write a Program to find the roots of the given quadratic equation using switch case.
2) Write a Program to generate and print first N FIBONACCI numbers.
3) Write a Program to find the GCD and LCM of two integer numbers.
4) Write a Program that reverses a given integer number and checks whether the number is palindrome or not.
5) Write a Program to find whether a given number is prime number or not.
6) Write a Program to determine if a character is alphabetic or numeric or special character.
7) Write a Program to sort 'n' numbers in descending order.
 8) Write a Program to find trace and normal of a square matrix.
9) Write a Program to read two matrices and perform addition and subtraction of two   matrices.
10) Write a program to multiply two matrices.
11) Write a Program to find the length of a string without using the built -in   function.
12) Write a Program to read a string and check whether it is a palindrome or not.
13) Write a Program to accept a sentence and convert all lowercase characters to uppercase and vice -versa.
14) Write a Program to find the factorial of a number using a function.
15) Write a Program to compute the sum of even numbers and the sum of odd numbers using a function.
16) Write a Program to swap two numbers using pointers.

Scheme of examination:
Theory for 60 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 10 mark.   (5*10=50 marks)
Practical for 30 marks: The practical marks of 30 is distributed as follows

	External (Two programs)	Internal
Algorithm	: 04	Record :10
Flowchart	: 04	
Program writing	: 08	
Program execution (only one)	: 04	
Total Marks	20	

BASIC ELECTRICAL & ELECTRONICS

Subject Code	BCA1.3	Theory exam for 100 marks	Theory paper IA	60 Marks 10 Marks
Total No of Lecture Hrs	52		Theory Exam duration	3 Hrs
Total No. of Lecture Hrs	04	Practical Exam Foe 30 marks	Final practical Exam IA	20 Marks 10 Marks
No of practical Hrs/Week	2+2		Practical Exam duration	3Hrs

UNIT-I: (10 Hrs)
    Network Theorems : Introduction – Kirchoff's law :Loop and node method of analysis, Norton's Theorem, Thevenin's Theorem , Delta / Star and Star / Delta Transformation.
 Operational Amplifiers : The Ideal Operational Amplifier, Saturation Property of an OPAMP, The Comparator, The Inverting OPAMP Circuit, The non inverting OPAMP Circuit, integrator, differentiator, astable multi vibrator using opamp.

UNIT-II: (10 Hrs)
    A.C. Fundamentals : Alternating voltage and current – Sinusoidal alternating voltage and current – Generation of alternating voltages and currents – Equation of alternating voltage and current – important a.c terminology and their important relations – values of alternating voltage and current – Peak value – Average value – Average value of sinusoidal current – R.M.S. or effective value – R.M.S value of sinusoidal current- importance of R.M.S. value of sinusoidal current – Importance of R.M.S. values – Form factor and Peak factor – Phase , Phase difference – Representation of alternating voltages and currents – Phasor representation of sinusoidal, Phasor diagram of sine waves of same frequency – Addition of alternating quantities, Phasor diagrams using r.m.s. values.

UNIT-III: (7 Hrs)
 Semiconducting Devices : Semiconductors, Diodes, Zener Diode, Diode V-I Characteristics, The Halfwave Diode Rectifier, The Full Wave Diode Rectifier, Full Wave Bridge Rectifier, Ripple, Ripple Factor, Shunt Capacitor Filter, Voltage Regulation, Zener Diode as Voltage Regulator

UNIT-IV: (15 Hrs)
    Digital Logic : Binary numbers, binary addition and subtraction, Unsigned Binary numbers, 1's compliments, 2's compliments, (r-1)'s compliment, (r)s compliments, Number base conversion, Octal and Hexadecimal number system, Fractional Numbers, Binary coded decimal Numbers.
    Boolean Algebra: Definition of Boolean Algebra, basic Laws and Theorems and properties of Boolean algebra, Simplification of Boolean functions (basic).

UNIT-V: (10 HRS)
    Logic Gates : Logic gates, Universal Logic Gates, Positive & Negative logic, Half adder & Full adder.

Digital Ic Families : Diode Transistor Logic, Transistor Transistor Logic, Emitter Coupled Logic, Metal oxide Semi Conductor & Complementary Metal oxide Semi Conductor

TEXT BOOKS:
1. V. K .Mehta, Basic Electrical Engineering.
2. Basic Electronics :A P Godse, U A Bakshi
3. Morris Mano M., Digital logic and Computer Design, PHI.
4. Morris Mano M., Computer System Architecture, PHI

REFERENCES :
1. K.R. Krishnamurthy, M. R. Raghuveer : Electrical and Electronics Engineering for Scientists and Engineers, NEW AGE INTERNATIONAL (P) LTD, Bengaluru.
2. V.N. Mittle, Basic Electrical Engineering – Tata – McGraw Hill publishing Co. Ltd.

COMPUTER LAB-2 (BASED ON BCA1.3)

Introduction: Draw all IC's 74 series pin diagram

1. Realization of logic gates (NOT, OR, AND, NAND, NOR & XOR using NAND gates)
2. Nand gates, Demorgan's laws & given Boolean expressions
3. Half wave diode rectifier.
4. Bridge rectifier using semiconductor diode .
5. Zener diode characteristics.
6. Zener diode as a voltage regulator
7. Op-amp as an inverting amplifier using IC 741.
8. Op-amp as an non- inverting amplifier using IC 741.
9. Design of half adder using NAND gates
10. Design of full adder using NAND gates.

Scheme of examination:

Theory for 60 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions   out of which 5 questions need to be answered. Each carries 10 mark.   (5*10=50 marks)
Practical for 30 marks: The practical marks of 30 is distributed as follows

	External(Two experiments)	Internal
Writing with Circuit drawing	: 10	Record : 10
Circuit connection and Execution(only one)	: 08	
Output/ Graph	: 02	
Total marks	20	

INTRODUCTION TO COMPUTERS AND OFFICE AUTOMATION

Subject Code	BCA1.4	Theory exam for 100 Marks	Theory paper IA	70 Marks 30 Marks
Total No. of Lecture Hrs	52		Theory Exam duration	3 Hrs
No of Lecture Hrs/Week	04	-	-	-

UNIT I: Introduction to Computers   **(6 Hrs)**

UNIT II : Hardware and Softwares   **(12 Hrs)**
        Hardware: Input devices - Keyboard, Mouse, Light pen, Joystick, Scanner, Digitizer. Output devices - Various types of printers, plotters, Secondary storage devices - Floppy disk, Hard disk, CD-ROM, Optical disk.
        Software: Definition of Software, types of Software -System software, Application software and Utility software, Computer Languages: Definition, types of Programming languages, Merits and demerits of all the languages, Language Processors: Assemblers, Interpreters, Compiler and Editors. Introduction to Operating Systems: Types of Operating System, Functions of Operating System examples. MS-DOS Internal Commands: DIR, CLS, TYPE, DATE, TIME, REN, COPY, DEL, CD, MD, RD External Commands: CHKDSK, FORMAT, SCANDISK
Machine Level Language, Assembly language, Higher level programming languages, Assemblers, Compilers and editors..

UNIT III Windows: **(8 Hrs)**
        Introduction to Windows, Starting Windows, Desk Top, Task Bar, Start Up Menu Working with programs and icons-Adding, removing, starting and quitting programs and icon. Working with files and folders-creating, deleting, opening, finding, copying, moving and renaming files and folders. Control Panel, setting, My Computer, Recycle bin, My documents, drives. Windows notepad, Accessories and windows Explorer.

UNIT IV : MS Office   **(20 Hrs)**
        MS-Word: Overview of Word Processing, Parts of word window, Types of Menus . Opening, creating saving, cut, copy and paste. print and print preview. Find and Replace, Header& Footer, save & save as, Borders and shading, Bullets & Numbering, spelling and Grammar, Word count, Mail Merge, Table handling and important shortcut keys, Macros.
        MS-PowerPoint: Overview of MS-PowerPoint, Slides, PowerPoint views, Auto content wizard, Custom Animation, Transition and build effects, Printing slides and important shortcut keys.
        MS- Excel: Overview of spreadsheet , examples, opening, creating, saving worksheet and workbook, print & print preview, rows & columns, formatting worksheet, Find & Replace, types of functions, types of charts/graphs, macros and important short keys.

UNIT V : Internet & Latest technologies   **(6 hrs)**
        Internet: Introduction to networking, classification of networking, URLs, browsing, creating an email account, composing, sending & receiving attachments , Downloading and Uploading files, search engines, Google.
        Latest technologies: Basic concepts of Artificial Intelligence, Machine Vision, Machine learning , Internet & Things(IOT), Big Data Analysis, Mobile Applications on Android & IOS.

REFERENCES:
1. Microsoft Office 2007 Training Guide, BPB Publications-2010
2. Fundamentals of Computers, V Rajaraman 6th edition PHI Learning Private Limited 2014
3. Sanjay Saxena: A First Course in Computers. Vikas Publishing House.
4. Peter Norton: Computing Fundamentals. 6th Edition, McGraw Hill-Osborne,2007
5. Alexis Leon and Marthews Leon: Introduction to Computers, Leon Vikas,1999.
6. By Greenlaw and Hepp ―Fundamentals of Internet and World Wide Web‖ TATA McGram-   Hill Publication
7. Cristian Crumlish ―The ABCs of the Internet , BPB Publicati
8. Ramesh Bangia ―Learning Internet and E-mail, Khanna Book Publishing
9. WWW.google .com for Latest technologies

Scheme of examination:
Theory for 70 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions   out of which 5 questions need to be answered. Each carries 12 mark.   (5*12=60 marks)

BCA II SEMESTER

MATHEMATICS-II
(For commerce students only)

Subject Code	BCA2.1(A)	Theory exam for 100 marks	Theory paper IA	70 Marks 30 Marks
Total No. of Lecture Hrs	52		Exam hours	3 Hrs
No of Lecture Hrs/Week	4	-	-	-

UNIT-I: (16 Hrs)

Algebra: Mathematical logic. Logical equivalence, Examples on switching circuits.

Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices,

Determinants: Definition, Minors, Cofactors, Properties of Determinants, Adjoint, Inverse, Cramers Rule, Eigen Values of a Matrix, Caley-Hamilton Theorem (without proof).

UNIT-II: (7 Hrs)

Vectors: Scalars and vectors, addition of two vectors, vector subtraction, scalar and vector dot and cross products**.**

UNIT-III: (12 Hrs)

Trigonometry: Inverse trigonometric functions, general solutions of trigonometric equations .

Complex numbers: Complex Numbers; Conjugate of a complex number; Modulus of a complex Number; geometrical representation of complex number; De Moivre's theorem; nth roots of a complex number.

UNIT –IV: (7 Hrs)

Analytical Geometry: Circles: Equation of a circle: standard form, central form, general form , parametric form.

UNIT-V: (10 Hrs)

Calculus: Integration: Standard integrals, integration of algebraic, logarithmic, exponential and trigonometric functions. Integration by parts, definite integrals, applications of definite integrals.

TEXT BOOKS :
1. B.G. Umarani and P.G. Umarani, , A Text Book of Mathematics for PUC I and II
2. B.M. Sreenivasa Rao, H. K. Venkatesh Bhatta and A. Anantha Rangan,, Excellent series, A Text Book of Mathematics for PUC I and II
3. Bosco S.S, Theory & Problems in MathematicsPUC I & II, BoscoSS Publications, Mangalore.

Scheme of examination:

Theory for 70 marks: Question paper will consists of two parts.

Part A

This part consists of 10 questions each carries one mark. (10*1=10 marks)

Part B

This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 12 marks. (5*12=50 marks)

ACCOUNTING AND FINANCIAL MANAGEMENT- II
(For Science/Diploma/Arts students only)

Subject Code	BCA2.1(B)	Theory exam for 100 marks	Theory paper IA	70 Marks 10 Marks
Total No. of Lecture Hrs	52		Exam duration	3 Hrs
No of Lecture Hrs/Week	04	-	-	-

UNIT-I :   **(12 Hrs)**

Cost Accounting - Meaning, Objectives & functions of Cost Accounting; cost accounting versus financial accounting; advantages and limitations of cost accounting.

Cost classification - Need and significance and methods of classification- Functional, behavioral, controllability, Variability, time element-wise classification, cost classification for managerial purposes; Segregation methods of Semi-variable costs into variable and fixed components; Preparation of cost sheets.

UNIT-II: **(12 Hrs)**

Material cost control - Meaning, objectives and classification of material cost; Purchase routine and determination of various levels; Prices of materials issues (FIFO & LIFO methods only).

UNIT-III: **(10 Hrs)**

Direct Labour cost control - Meaning, objectives and classification of labour cost; Computation of total direct labour cost. Methods of remuneration- time rate, place rate (including differential piece-rates)-incentive Plans-Halsay and Rowan plans only.

UNIT-IV: **(8 Hrs)**

Overhead cost control - Classification and collection of overhead cost; Primary and Secondary distribution of overheads; overheads absorption methods- direct labor hour rate and machine hour rate method only.

UNIT-V: **(10 Hrs)**

Company Account: Issue of shares at par, premium and discount. Forfeiture of Shares Re - issue of forfeited shares. Issue of debentures at par, premium and at discount. Preparation of company final account. Financial statements Analysis and Interpretation meaning, objectives and classification of ratios- liquidity, solvency, activity and profitability ratios; advantages and limitations of ratio analysis.

TEXT BOOKS:
1. Dr.G,B. Baligar, Cost Accountig, Ashok Prakashna
2. S. N. Maheshwari, Advanced Accounting, S. Chand and Sons
3. R.L. Gupta, Advanced Accounting.
4. Dutta, Cost Accounting Pearson Education 2003
5. Jain, Narang, Cost Accounting; Kalyani Publishers; New Delhi

Scheme of examination:
Theory for 70 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 12 mark.   (5*12=60 marks)

B.C.A 2.2 : DATA STRUCTURES USING C

Subject Code	BCA 2.2	Theory exam for 70 marks	Theory paper IA	60 Marks 10 Marks
Total No. of Lecture Hrs	52		Exam duration	3 Hrs
No of Lecture Hrs/Week	04	Practical Exam For 30 marks	Final practical Exam IA	20 Marks 10 Marks
No of practical Hrs/Week	2+2		Practical Exam duration	3Hrs

UNIT-I: **(10 Hrs)**

Introduction to Data structures: Definition, Classification of data structures : primitive and non-primitive, Operations on data structures.

Dynamic memory allocation and pointers: Definition Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Meaning of static and dynamic memory allocation, Memory allocation functions: malloc, calloc, free and realloc.

Recursion: Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD.

UNIT-II: **(10 Hrs)**

Searching and Sorting.

Search: Basic Search Techniques: Search algorithms: Sequential search, Binary search - Iterative and Recursive methods. Comparison between sequential and binary search.

Sort - General Background: Definition, different types: Bubble sort, Selection sort, Merge sort, Insertion sort, Quick sort

UNIT-III: **(12 Hrs)**

Files - Introduction: Definition Basic file operations : Naming a file, Opening a file, Reading data from file, writing data to a file, and closing a file. Defining, opening and closing a file. Input / Output operations on files: getc, putc, getw, putw, fprintf, fscanf. Error handling during I/O operations: Common errors during I/O operations, feof, ferror Random Access of files: fseek, ftell, rewind functions.

Stack - Definition, Array representation of stack, Operation on stack: Infix, prefix and postfix notations Conversion of a arithmetic expression from Infix to postfix. Applications of stacks.

UNIT-IV: **(14 Hrs)**

Queue - Definition, Array representation of queue, Types of queue: Simple queue, circular queue, double ended queue (deque), priority queue, operations on all types of queues.

Linked List - Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Operations on singly linked list: creation, insertion, deletion, search and display. Types of linked list: Singly linked list, Doubly linked list, Circular linked list and circular doubly linked list.

UNIT V   **(6 Hrs)**

Trees - Definition: Tree, Binary tree, Complete binary tree, Binary search tree, Tree terminology: Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, siblings, level, edge, path, depth, parent node, ancestors of a node. Binary tree: Array and dynamic representation of tree, Creation of binary tree, Traversal of Binary Tree: Preorder, Inorder and Postorder.

TEXT BOOKS :
1. A.M. Padma Reddy, Systemic approach to data structures using   C, Sri Nandi Publications.
2. E. Balaguruswamy Programming in ANSI C.
3. P.B. Kotur , Progamming in C and Data structures, Sapana book house, Bengaluru.
4. Bandopadhyay, Data Structures Using C Pearson Education

REFERENCES:
1. Tannenbaum, Data Structures Using C. Pearson Education
2. Kamthane: Introduction to Data Structures in C. Pearson Education 2005.
3. Langsam, Ausenstein Maoshe& M. Tanenbam Aaron Data Structures using and
   C^{++} Pearson Education

COMPUTER LAB-1(BASED ON BCA2.2)

1. Write a C program to search for an element in an array using sequential search
2. Write a C program to search for an element in an array using binary search
3. Write a C program to sort a list of N elements using Bubble sort Technique
4. Write a C program to sort a list of N elements using Merge sort Algorithm.
5. Write a C program to sort a list of N elements of integer type using Quick sort algorithm.
6. Write a C program to find the Binomial coefficient using recursion.
7. Write a C program to simulate the working of Towers of Hanoi problem for N disks. Print the total number of moves taken by the program.
8. Write a C program to demonstrate the working of a stack of size N using an array. The elements of the stack maybe assumed of type integer or real. The operations to be supported are i) PUSH ii) POP iii) DISPLAY. Program should print appropriate messages for STACK overflow, and underflow. Use separate functions to detect these cases.
9. Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to postfix expression, the expression consists of single character (letter or digit) as operands and +, -, * , / as operators, assume that only binary operators are allowed in the expression
10. Write a C program to simulate the working of an ordinary Queue using an array. Provide the operations QINSERT, QDELETE and QDISPLAY. Check the Queue status for empty and full.
11. Write a C program to simulate the working of a Circular Queue using an array. Provide the operations CQINSERT, CQDELETE and CQDISPLAY. Check the Circular Queue status for empty and full.
12. Using dynamic variables and pointers, write a C program to construct a singly linked list consisting of the following information in each node: Roll-No (Integer), Name (Character string) The operations to be supported are:
a) LINSERT Inserting a node at the front of the list
b) LDELETE Deleting the node based on Roll- No
c) LSEARCH Searching a node based on Roll-No
d) LDISPLAY Displaying all the nodes in the list
13. Write a C program using dynamic variables and pointers to construct a binary search tree of integers, Write C functions to do the following;
   a) Given a KEY , perform a search in Binary search tree. If it is found display Key found else insert the key in the Binary search tree.
   b) While constructing the Binary search tree do not add any duplicate
   c) Display the tree using any one of the traversal methods.

14. Write a C program to create a file for N students. It should contain Roll-NO, Name, Marks in two subjects. Using the above created file, create an output file which contains Roll-No, Name, Marks in two subjects, Total and Average.

Scheme of examination:
Theory for 60 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 10 mark.   (5*10=50 marks)

Practical for 30 marks: The practical marks of 30 is distributed as follows

	External (Two Programs)	**Internal**
Flowchart	: 06	Record : 10
Program writing	: 08	
Program Execution(only one)	: 06	
	_____	
Total marks	20	

NUMERICAL AND STATISTICAL METHODS

Subject Code	2.3	Theory exam for 70 marks	Theory paper IA	60 Marks 10 Marks
Total No. of Lecture Hrs	52		Exam duration	3 Hrs
No of Lecture Hrs/Week	04	Practical Exam For 30 marks	Final practical Exam IA	20 Marks 10 Marks
No of practical Hrs/Week	2+2		Practical Exam duration	3Hrs

UNIT-I: **(10 Hrs)**
        Numerical Methods: Solution of equations (polynomial and transcendental equations). Interval halving methods, secant, Regula-Falsi, Newton-Raphson methods, Fixed point iteration method.

UNIT-II: **(10 Hrs**)
        Solution of system of linear equations: Gaussian elimination method, Gauss Jordan, Gauss-Siedel iteration methods, LU Decomposition method, Eigen values and Eigen vectors of a Square matrix.

UNIT-III: **(14 Hrs)**
        Interpolation : Forward and backward differences ,Newtons forward and backward differences formula, Lagrange's interpolation and Lagrange's inverse interpolation formula.
Numerical differentiation, Integration: Numerical differentiation forward and backward formula, Trapezoidal and Simpson's formula. Romberg Integration.

UNIT-IV: **(10 Hrs)**
Statistical Methods:
        Basic concepts and definition of statistics: Mean, median, mode, standard deviation, coefficient of variation, skewness & kurtosis, Karl Pearson Correlation coefficient, Rank correlation and illustrated examples.

UNIT-V: **(8 Hrs)**
        Probability: Basic concepts and definition of probability, Probability axioms, Conditional probability, Addition and Multiplication theorem of probability (based on set theory concepts), Baye's theorem, Problems and applications.
 TEXT BOOKS:
1. Sunil S.Patil, Numerical & Statistical Methods, EBPB.
2. M.K Jain , SRK Iyengar and R.K. Jain Numerical Methods for Scientific and engineering computation: Wiley Eastern (1998)
3. S.S .Shastry. : Introductory Methods of Numerical Analysis PHI (New Delhi) 2001.

REFERENCES:
1.B. S. Grewal, Elementary Engineering Mathematics, Khanna Publishers
2. K.S.Trevedi (1998) Probability and Statistics with Reliability Queuing and
   computer Science application Prentice Hall of India, Pvt. Ltd ,New Delhi

COMPUTER LAB-2 (BASED ON BCA2.3)

Numerical methods:

1) Write a program to interchange primary and secondary diagonal elements of a square matrix

2) Write a program to find the row sum, column sum, primary diagonal sum and secondary diagonal sum of a matrix.

3) 4) Write a program to accept a square matrix and determine whether it is an identity matrix or not.

5) Write a program to find the roots of an equation $f(x) = 0$ using Bisection method.

6) Write a program to find the roots of an equation $\cdot(x) = 0$ using Regula – Falsi   method.

7) Write a program to find the roots of an equation $f(x) = 0$ using Newton Raphson method.

8) Write a program to find the definite integral of a function using Trapezoidal rule.

9) Write a program to find the definite integral of a function using Simpson's $1/3^{rd}$ and $3/8^{th}$ rules using switch case.

10) Write a program to solve the system of equations $Ax = b$ using Gauss Elimination method.

11) Write a program to solve the system of equations $Ax = b$ using Gauss Seidel method.

STATISTICAL METHODS:

1) Write a program to construct a discrete frequency distribution table and find mean and standard deviation.

2) Write a program to construct a continuous frequency distribution table for given data and find mean and standard deviation.

3) Write a program to find Arithmetic mean, Geometric mean and Harmonic mean of N given numbers.

4) Write a program to find the mean, mode and median of continuous frequency distribution.

5) Write a program to find the Karl Pearson correlation coefficient between two variables.

6) Write a program to find the rank correlation coefficient between two variables.

Scheme of examination:

Theory for 60 marks: Question paper will consists of two parts.

Part A

This part consists of 10 questions each carries one mark.   (10*1=10 marks)

Part B

This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 10 mark.   (5* 10=50 marks)

Practical for 30 marks: The practical marks of 30 is distributed as follows

	External (Two Programs)	**Internal**
Flowchart	: 06	Record : 10
Program writing	: 08	
Program Execution(only one)	: 06	
Total marks	20	

COMPUTER ORGANIZATION & ARCHITECTURE

Subject Code	BCA2.4	Theory exam for 100 marks	Theory paper IA	70 Marks 30 Marks
Total No. of Lecture Hrs	52		Exam duration	3 Hrs
No of Lecture Hrs/Week	04	-	-	-

UNIT-I: **(10 Hrs)**
       Digital Logic Circuits: map simplification, combinational circuits: flip-flops- SR Flip Flop, D- Flip flop, JK-flip flop, T-flip flop, Edge triggered flip flop, master slave flip flop, decoders and multiplexers.
UNIT-II: **(10 Hrs)**
       Shift registers , Counters: Asynchronous counters (Ripple counter), Binary ripple counter, Synchronous counters , Binary counter, Binary up-down counter, timing sequence. decoders and multiplexers.
       Data Representation: Data types, fixed-point representation, floating-point representation, other binary codes, Gray code, error detection codes.
UNIT-III: **(16 Hrs)**
       Basic Computer Organization and Design: Instruction codes, Computer instruction, timing and control, execution and instruction, input-output and interrupt .
Central Processor Organization: Processor bus organization, arithmetic logic unit (ALU), stack organization, instruction formats, addressing modes, data transfer and manipulation, program control.
UNIT-IV: **(10 Hrs)**
       Input-Output Organization: Peripheral devices, I/O interface, asynchronous data transfer, direct memory access (DMA), priority interrupt, daisy chain priority, parallel priority interrupt, input-output processor (IQP).
UNIT-V: **(6 Hrs)**
       Memory Organization: Memory hierarchy, RAM, ROM, Auxiliary memory, Associative memory, virtual memory, cache memory, memory management hardware.
TEXT BOOKS:
1. Morris Mano M., Digital logic and Computer Design, PHI.
2. Morris Mano M., Computer System Architecture, PHI
3. Stallings , Computer Organization and Architecture, *6/e* Pearson Education 2002
REFERENCES:
1. Mano: Computer System Architecture, Pearson Education
2. M. Morris Mano, Computer System Architecture, 2nd Edition Prentice Hall of India (1991)
3. William Stallings, Computer Organization and Architecture, Pearson Education (2003)
4. Andrew S. Tannenbaum, Structured Computer Organization; 3rd Edition, Prentice Hall of India, (1990).
<u>**Scheme of examination:**</u>
Theory for 70 marks: Question paper will consists of two parts.
Part A
This part consists of 10 questions each carries one mark.   (10*1=10 marks)
Part B
This part consists of 7 questions and out of which 5 questions need to be answered. Each carries 12 mark.   (5*12=60 marks)