BENGALURU CENTRAL UNIVERSITY

BACHELOR OF COMPUTER APPLICATIONS, SYLLABUS (2019-20 ONWARDS)

Title of Papers and Scheme of Study & Examination for BCA, Under Choice Based Credit System - Semester System (Revised w.e.f. 2019-2020)

Sem	Part	Paper Code	Title of Paper	Hours/ Week	Marks			Credits	
					IA	Exam	Total	Subject	Semester
I	Part 1	BCA 101T	Indian Language	4	30	70	100	2	16
		BCA 102T	English	4	30	70	100	2	
	Part 2	BCA 103T	Problem Solving Techniques using C	4	30	70	100	2	
		BCA 104T	Computer Organizations	4	30	70	100	2	
		BCA 105T	Discrete Mathematics	5	50	100	150	3	
		BCA 103P	C Programming Lab	3	15	35	50	1	
		BCA 104P	Office Automation	3	15	35	50	1	
	Part 3		Foundation Course	3	30	70	100	2	
			CC & EC		50		50	1	
II	Part 1	BCA201T	Indian Language	4	30	70	100	2	16
		BCA202T	English	4	30	70	100	2	
	Part 2	BCA203T	Data Structures	4	30	70	100	2	
		BCA204T	Database Management System	4	30	70	100	2	
		BCA205T	Numerical and Statistical Methods	5	50	100	150	3	
		BCA203P	Data Structures using C lab	3	15	35	50	1	
		BCA204P	DBMS Lab Using Oracle	3	15	35	50	1	

Sem	Part	Paper Code	Title of Paper	Hours/Week	IA	Exam	Total	Subject	Semester
	Part 3		Foundation Course	3	30	70	100	2	
			CC & EC		50		50	1	

Sem	Part	Paper Code	Title of Paper	Hours/Week	Marks			Credits	
					IA	Exam	Total	Subject	Semester
III	Part 1	BCA301T	Indian Language	4	30	70	100	2	16
		BCA302T	English	4	30	70	100	2	
	Part 2	BCA303T	Object oriented Programmi ng using C++	4	30	70	100	2	
		BCA304T	Financial Accounting and Manage-ment	4	30	70	100	2	
		BCA305T	Operating System	5	50	100	150	3	
		BCA303P	OOPS Using C++ Lab	3	15	35	50	1	
		BCA304P	Tally Lab	3	15	35	50	1	
	Part 3		Foundation Course	3	30	70	100	2	
			CC & EC		50		50	1	
IV	Part 1	BCA401T	Indian Language	4	30	70	100	2	16
		BCA402T	English	4	30	70	100	2	
	Part 2	BCA403T	VB.NET Programming	4	30	70	100	2	
		BCA404T	Unix and Shell Programming	4	30	70	100	2	
		BCA405T	Software Engineering	5	50	100	150	3	
		BCA403P	VB.NET Lab	3	15	35	50	1	
		BCA404P	Unix Lab	3	15	35	50	1	
	Part 3		Skill Development	3	30	70	100	2	
			CC & EC		50		50	1	

Sem	Part	Paper Code	Title of Paper	Hours/ Week	Marks			Credits	
					IA	Exam	Total	Subject	Semester
V	Part 2	BCA501T	Data Communication and Networks	5	50	100	150	3	20
		BCA502T	Artificial Intelligence	5	50	100	150	3	
		BCA503T	Java Programming	4	30	70	100	2	
		BCA504T	Analysis and Design of Algorithm	4	30	70	100	2	
		BCA505T	Elective 1	5	50	100	150	3	
		BCA503P	Java Programming Lab	3	15	35	50	1	
		BCA504P	Analysis and Design of Algorithm Lab	3	15	35	50	1	
		BCA506P	Project	6	50	100	150	3	
	Part 3		Skill Development Course	3	30	70	100	2	
VI	Part 2	BCA601T	System Programming	5	50	100	150	3	20
		BCA602T	Professional and Business Communication	5	50	100	150	3	
		BCA603T	WEB Programming	4	30	70	100	2	
		BCA604T	Elective 2	5	50	100	150	3	
		BCA605T	WEB Programming Lab	3	15	35	50	1	
		BCA605P	Project Work	12	100	200	300	6	
	Part 3		Skill Development Course	3	30	70	100	2	

FIRST SEMESTER

BCA 101T – INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University

BCA 102T – ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University

BCA103T: PROBLEM SOLVING TECHNIQUES USING C

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit – I   **12 Hours**

Introduction to Programming Concepts: Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

Unit - II   **10 Hours**

Managing Input and Output Operation: Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement, ?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

Unit - III   **10 Hours**

Arrays: Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

Unit-IV   **10 Hours**

Structures-Declaring and Initializing, Nested structure, Array of Structure, Passing Structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

Unit-V   **10 Hours**

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

TEXT BOOKS

1. E. Balaguruswamy, "Programming In ANSI C", 4th edition, TMH Publications, 2007

2. Manjunath Aradhya, " Programming and Data Structures" , Cengage Publications 2017

3. A. K. Sharma, "Computer Fundamentals and Programming in C", University Press, 2018

REFERENCES BOOKS

1. Ashok N. Kamthane et. al., "Computer Programming and IT", Pearson Education, 2011

2. Mahapatra, " Thinking In C ", PHI Publications, 1998.

3. Yashwant Kanetkar, "Let Us C", 13th Edition, PHP, 2013

BCA 104T – Computer Organization

Total Teaching Hours: 52   **No of Hours / Week : 04**

Unit-I   12 Hours

Digital Logics: Basic logic gates, Universal gates, Combinational circuits-Half adder and full adder, Flip flops-SR-Flip flop, D-flip flop, J-K flip flop, T flip flop. Boolean Algebra: Simplification of expression, K-Map- 2,3 and 4 variables SOP and POS.

Unit-II   10 Hours

Number System: Binary, octal and hexadecimal system, Basic Conversions, Binary addition ,subtraction ,multiplication and division (integers only), Complements-1's,2''s,9's and 10's complements, One's complement subtraction method, Two's complement subtraction method, Weighted and Non-Weighted codes. Binary to gray codes, Gray toBinary codes,Excess-3 Codes.

Unit-III   10 Hours

Computer Organization: Instruction format ,Types of basic computer instruction format ,Instruction cycle, Design of basic computer flowchart, Interrupt and its types, Interrupt cycle

Unit-IV   10 Hours

CPU organization: Arithmetic and logic unit(ALU),One,two and three address instruction format ,Data transfer and manipulation instruction, Arithmetic instructions, Logical instructions and shift instructions

Unit-V   10 Hours

Memory Management: Input, output and storage devices, Memory and its types, Direct memory Access, Auxiliary memory, Associative memory and Cache memory

Text Books

1. Floyd, Digital Fundamentals, 8th Edition, Pearson Education
2. Morris Mano, Computer System Architecture, IV th edition, Prentice Hall of India

Reference Books

1. Digital Design, Morris Mano and Michael D.Cilette, Vth edition , Pearson Education
2. William Stallings, Computer Organization and Architecture, Pearson Education

BCA105T: DISCRETE MATHEMATICS

Total Teaching Hours: 65   **No of Hours / Week: 05**

Unit-I   **13 Hrs**

Sets, Relations and Functions: Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, De-mogan's law, Simple Applications. Relations, Properties of Relations, Equivalence Relation, Function: Domain and Range, Onto, Into, One to One, one to many Functions, Composite and Inverse Functions. Mathematical Logic: Proposition and truth values, Logical Connectives and their truth tables, Converse, Inverse and Contrapositive, Tautology and Contradiction, Logical Equivalence – Standard Theorems, Switching Circuits.

Unit-II   **13 Hrs**

Matrices: Review of fundamentals: Definition of matrix, order, Types of matrices: zero, row, column, square, diagonal, scalar, unit, symmetric, skew-symmetric. Determinant: Value of determinant of order 2x2, 3x3, minors, cofactors, adjoint, inverse of a matrix. Solutions of linear equations: Cramers rule and matrix method involving two and three variables. Eigen values and Eigenvectors: Characteristic equation, characteristic roots, characteristic vectors (without any theorems) only 2x2 order. Cayley Hamilton theorem. (Only statement), verification of Cayley Hamilton theorem (only 2x2 matrices), using the same finding the powers of A (A4, A5, A-1, A-2), Inverse of a Matrix using Cayley-Hamilton theorem.

Unit-III   **13 Hrs**

Logarithms: Definition of Logarithm, Indices leading to Logarithms and vice versa, Laws of Logarithms with proofs, Problems, Common Logarithm: Characteristic and Mantissa, Use of Logarithmic Tables, Problems. Permutation and Combination: Fundamental Principle of Counting, Factorial n, Permutations: Definition, Examples, Derivation of Formula nPr, Permutation when all the objects are not distinct, Problems, Combinations: Definition, examples, Proving nCr = nPr r!, nCr = nCn-r, nCr + nCr-1 = n+1Cr , Problems based on above formulae.

Unit-IV   **13 Hrs**

Groups: Binary operation, Define of group, properties (only statement), problems (both finite and infinite groups), subgroup, theorems (no proof), problems. Vectors: Definition of vector and scalar, vector addition, dot and cross product, projection of a vector on the other (no geometrical meaning), area of parallelogram, area of a triangle, scalar triple product, volume of parallelepiped, co planarity of three vectors, vector triple product.

Unit-V   **13 Hrs**

Analytical Geometry in Two Dimensions: Coordinates, Distance formula, Section Formula, Area of the Triangle formula (no derivation), Locus of point. Straight Line: Slope of a line and angle between two lines, Various forms of equations of lines – Derivation and Problems. Equation of family of lines passing through the point of intersection of two lines, Distance of a point from line (only problems)

Text Books

1. Grewal, B.S.Higher engineering Mathematings, 36th Edition

    Reference Books

    1. Satyrs S.S, Engineering Mathematics.

    2. Peter V.O'Neil. Advanced Engineering Mathematics, 5th Edition

BCA104P – Microsoft Office Automation Lab
Any Ten
1. Creating the documents with Special effects like underline, bold, different size, different font and different color.
2. Creating Paragraphs Inserting Date & Time, Pictures, Bullets & Numbering , indentation etc. in MS-Word
3. Formatting features of MS-Word.-it includes paper-size, margins, header and footer, page no. and creation of table options.
4. Creation of mail merge for sending the new year wish to your class group .
5. Creating Worksheets in Excel- , Inserting, Deleting, Copying, Moving worksheets in Excel Usage of formulas, Built-in functions in Excel
6. Graph-Plotting facilities in MS Excel
7. Writing conditional expressions (using IF) and Using logical functions (AND, OR, NOT) Using lookup and reference functions (VLOOKUP, HLOOKUP, MATCH, INDEX)
8. Data Validations :Specifying a valid range of values for a cell, Specifying a list of valid values for a cell, Specifying custom validations based on formula for a cell, Sorting and Filtering Data ,Macro facility in MS Excel
9. Creating a presentation in PowerPoint- - Inserting / Deleting slides in PowerPoint
10. Creation of Slide transition and Editing special effects in PowerPoint
11. Creation of Inserting sound and picture in PowerPoint
12. Creation of Inserting chart and organization chart in PowerPoint.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

BCA 103P-PRACTICALS IN C PROGRAMMING

List of programs:

Part A

Any Ten

1. To design a program and find the roots of the quadratic equations using if-else-if.
2. To design a Menu driven program using switch case and find a)Sum of digits of a number b) Factorial of N
3. To design a program and find whether a given number is prime or not.
4. To arrange the given numbers in ascending and descending order.
5. To design a program and find product of N*M matrix.
6. To design a program and calculate NCR using functions.
7. To design a program and display Fibonacci series using recursive functions.
8. To design a program and find length of a string without using built in function.
9. To design and implement a program to concatenate two strings using pointers.
10. To design and implement a program to compare two strings using pointers.
11. To design a program to accept details of students such as roll no, name, semester and display them using structures.
12. To design a program to copy content of one file to another file.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

SECOND SEMESTER

BCA201T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA202T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA203T: DATA STRUCTURES

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit-I   **12 Hours**

Introduction and Overview: Definition, Elementary data organization, Data Structures, data structures operations, Abstract data types, algorithms complexity, time-space tradeoff. Preliminaries: Mathematical notations and functions, Algorithmic notations, control structures, Complexity of algorithms, asymptotic notations for complexity of algorithms. String Processing: Definition, Storing Stings, String as ADT, String operations, word/text processing, Pattern Matching algorithms

Unit-II   **10 Hours**

Arrays: Definition, Linear arrays, arrays as ADT, Representation of Linear Arrays in Memory, Traversing Linear arrays, Inserting and deleting, Sorting: Bubble sort, Insertion sort, Selection sort, Searching: Linear Search, Binary search, Multidimensional arrays, Matrices and Sparse matrices.

Unit-III   10 Hours

Linked list: Definition, Representation of Singly linked list in memory, Traversing a Singly linked list, Searching a Singly linked list, Memory allocation, Garbage collection, Insertion into a singly linked list, Deletion from a singly liked list; Doubly liked list, Header liked list, Circular linked list.

Unit-IV   10 Hours

Stacks – Definition, Array representation of stacks, Linked representation of stacks, Stack as ADT, Arithmetic Expressions: Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of recursive procedures by stack. Queues – Definition, Array representation of queue, Linked list representation of queues Types of queue: Simple queue, Circular queue, Double ended queue, Priority queue, Operations on Queues, Applications of queues.

Unit-V   10 Hours

Graphs: Graph theory terminology, Sequential representation of Graphs: Adjacency matrix, traversing a Graph. Tree – Definitions, Binary trees, Representing binary trees in memory, Traversing Binary Trees, Binary Search Trees, Searching, Inserting and Deleting in a Binary Search Tree.

Text Books:

1. Fundamentals of Data Structure in C, University Press,2018

REFERENCES BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2013.
2. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla, "Data Structures and Program Design using C", Pearson Education, 2009.
3. Forouzan, "A Structured Programming Approach using C", 2nd Edition, Cengage Learning India, 2008.

BCA204T: DATA BASE MANAGEMENT SYSTEMS

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit - I   **12 Hours**

Introduction: Database and Database Users, Characteristics of the Database Approach, Different people behind DBMS, Implications of Database Approach, Advantages of using DBMS, When not to use a DBMS. Database System Concepts and architecture: Data Models, Schemas, and Instances. DBMS Architecture and Data Independence, Database languages and interfaces. The database system Environment, Classification of DBMS.

Unit - II   **10 Hours**

Data Modeling Using the Entity-Relationship Model: High level conceptual Data Models for Database Design with and example., Entity types, Entity sets, attributes, and Keys, ER Model Concepts, Notation for ER Diagrams, Proper naming of Schema Constructs, Relationship types of degree higher than two. Record Storage and Primary File Organization: Secondary Storage Devices. Buffering of Blocks. Placing file Records on Disk. Operations on Files, File of unordered Records (Heap files), Files of Ordered Records (Sorted files), Hashing Techniques, and Other Primary file Organization.

Unit - III   **10 Hours**

Functional Dependencies and Normalization for Relational Database: Informal Design Guidelines for Relational schemas, Functional Dependencies, Normal Forms Based on Primary Keys., General Definitions of Second and Third Normal Forms Based on Primary Keys., General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form. Relational Data Model and Relational Algebra: Relational Model Concepts., relational Model Constraints and relational Database Schema, defining Relations, Update Operations on Relations., Basic Relational Algebra Operations, Additional Relational Operations., Examples of queries in the Relational Algebra., Relational Database design Using ER-to-Relational Mapping.

Unit – IV   **10 Hours**

Relational Database Language: Data definition in SQL, Queries in SQL, Insert, Delete and Update Statements in SQL, Views in SQL, Specifying General Constraints as Assertions, specifying indexes, Embedded SQL. PL /SQL: Introduction.

Unit - V   **10 Hours**

Transaction Processing Concepts: Introduction, Transaction and System Concepts, Desirable properties of transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Locking Techniques for Concurrency Control, Concurrency Control based on time stamp ordering.

Text book:

1. Remez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2007.

References:

 1. Abrahamsi. Silberschatz, Henry. F. Korth, S. Sudarshan, "Database System Concepts" 6th Edition, McGraw Hill, 2012.

2. C.J.Date, "Introduction to database systems", Eight Edition, Addison Wesley, 2003.

BCA205: NUMERICAL AND STATISCAL METHODS

Total Teaching Hours: 65   **No of Hours / Week : 05**

Unit - I   13 Hours

Floating-point representation and errors-Normalized floating-point forms, Errors in representing numbers, Floating point machine number and machine epsilon, Loss of significance and its avoidance. Roots of equations-locating roots of $f(x)=0$ Bisection method, Newton's method, Secant method.

Unit - II   13 Hours

Interpolation and numerical differentiation-polynomial interpolation, Lagrange and Newton form of interpolating Polynomial, Divided difference and recursive property, Inverse interpolation, First and Second derivative formulae via interpolation Polynomials. Numerical integration-Trapezoidal, Simpson's and adaptive Simpson rules.

Unit - III   13 Hours

System of linear equations-Gaussian elimination and back substitution-partial and complete pivoting, Doolittle, Cholesky and Crout LU decomposition methods, Jacobi and Gauss – Seidel iterative methods. Power (and inverse power) method of obtaining largest (smallest) eigenvalue and corresponding eigenvector. Ordinary differential equations-initial value problem, Picard's, Taylor series, Runge-Kutta first, second and fourth order methods.

Unit – IV   13 Hours

Basics concepts and definition of statistics. Mean, Standard deviation, coefficient of Variation, skewness & kurtosis, Carl Pearson Correlation, Rank correlation and illustrated examples. Probability: Basic concept and definition of probability, probability axioms, Laws of Probability, Conditional probability, Bayes theorem , Problems and application.

Unit - V   13 Hours

Random variable and Expectation: Discrete and continuous random variables, expectation of random variables, theorems on expectation, illustrative examples. Probability Distribution: Probability function, Probability mass/density function, Discrete Distribution – Bernoulli, Binomial Distribution, Continuous distribution – Normal Distribution, applications and problems.

BCA203P: DATA STRUCTURES USING C LAB

PART - A

1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation (ii) String Reverse
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 Merge sort technique.

4. Write a C program to sort a list of N elements of integer type using Quick Sort technique.

5. Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to postfix expression.

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 moves taken by the problem using recursion.

8. Write a C program to demonstrate the working of a stack using an array. The elements of the stack may be integers. Operations to be supported are 1.PUSH, 2.POP 3.DISPLAY. The program should print appropriate messages for STACK overflow, Underflow. Use separate functions to detect these cases.

9. Write a C program to implement the operations of a Queue using linked list.

10. Using dynamic variables and pointers, Write a C program to construct a doubly linked list consisting of the following information in each node. Roll No (Integer), Name (Character String) .The Operations to be supported are:

a. DLINSERT - Inserting a node in the front of the list and after a node.

b. DLDELETE - Deleting the node based on Roll no.

c. DLSEARCH - Searching a node based on Roll no.

d. DLDISPLAY - Displaying all the nodes in the list.

11. The preorder and inorder traversals of a binary search tree is given below:

Inorder: 5, 10, 15, 20, 30, 40

Preorder: 20, 10, 5, 15, 40, 30

Write a program that can generate the postorder traversal of the binary search tree.

12. Using dynamic memory allocation ,construct a Binary Search Tree of integers. Write C functions to do the following:

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.

While constructing the Binary search tree do not add any duplicate.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 10 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks

Execution of one program - 10 Marks

Formatting the Output - 05 Marks

Viva - 05 Marks

Record - 05 Marks

Total - 35 Marks

BCA204P: DATABASE MANAGEMENT SYSTEM LAB

PART – A

1. The EMP detail databases has a table with the following attributes. The primary keys are underlined.

EMP (EmpNo: int, name: string, dob: date, PhNo: int)

a) Create the above table.

b) Remove the existing attributes from the table.

c) Change the date type of regno from integer to string.

d) Add a new attribute Date of Joining(DOJ) to the existing table.

e) Enter five tuples into the table.

f) Display all the tuples in student table.

2. CONSIDER THE FOLLOWING RELATIONS:

Student (snum: integer, sname: string, major: string, level: string, age: integer)

Class (name: string, meets at: string, room: string, fid: integer)

Enrolled (snum: integer, cname: string)

Faculty (fid: integer, fname: string, deptid: integer)

a) Create the above table.

b) Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. Harshith

c) Find the names of all classes that either meet in room R128 or have five or more Students enrolled.

d) Find the names of all students who are enrolled in two classes that meet at the same time.

e) Find the names of faculty members who teach in every room in which some class is taught.

f) Find the names of faculty members for whom the combined enrolment of the courses that they teach is less than five.

3. A LIBRARY database has a table with the following attributes.

LIBRARY (bookid:int, title: string, author: string, publication: string, yearpub:int, price: real)

a) Create the above table.

b) Enter the five tuples into the table

c) Display all the tuples in student table.

d) Display the different publishers from the list.

e) Arrange the tuples in the alphabetical order of the book titles.

f) List the details of all the books whose price ranges between Rs. 100 and Rs. 300

4. Employee database has a table with the following attributes.

employee (emp_id: integer, emp_name: string, gender: character)

department (dept_id: integer, dept_name: string)

pay details (emp_id: integer, dept_id: integer, salary: integer)

a) Create the above tables by properly specifying the primary keys and the foreign keys

b) Enter at least 5 tuples for each relation.

c) List all the employee name, department name and salary

d) Give a count of how many employees are working in each department

e) List all female employees in alphabetic order.

5. The SALARY database of an organization has a table with the following attributes.

EMPSALARY (empcod:int, emp_name: string, dob: date, department: string, salary: real)

a) Create the above table.

b) Enter the five tuples into the table

c) Display all the number of employees working in each department.

d) Find the sum of the salaries of all employees.

e) Find the sum and average of the salaries of employees of a particular department.

f) Find the least and highest salaries that an employee draws.

6. Consider the insurance database given below. The primary keys are underlined, and the data types are specified.

PERSON (driver-id-no: string, name: string, address: string)

CAR (regno: string, model: string, year: int)

ACCIDENT (report-no: int, date: date, location: String)

OWNS (driver-id-no: string, regno: string)

PARTICIPATED (driver-id-no: string, regno: string, report-no: int, damage-amount: int)

a) Create the above tables by properly specifying the primary keys and the foreign keys

b) Enter at least five tuples for each relation.

c) Demonstrate how you:

i. Update the damage amount for the car with some specific regno in the accident with report no 12 to 25000.

ii. Add a new accident to the database.

d) Find total number of people who owned cars that were involved in accidents in 2002

e) Find the number of accidents in which cars belonging to a specific model were involved

7. Consider the following database of student's enrollment in courses and books adopted for each course.

STUDENT (regno: string, name: string, major: strong, bdate: date)

COURSE (course-no: int cname: string, dept: string)

ENROLL (reg-no: string, course-no: int, sem: int, marks: int)

BOOK-ADOPTION (course-no: int, sem: int, book-isbn: int)

TEXT (book-isbn: int, book-title: string, publisher: string, author: string)

a) Create the above tables by properly specifying the primary keys and the foreign keys

b) Enter at least five tuples for each relation.

c) Demonstrate how you add a new text book to the database and make this book be adopted by some department.

d) Produce a list of text books (include Course-no, book-isbn, book-title) in the alphabetical order for courses offered by the 'Compute Science' department that use more than two books.

e) List any department that has all its adopted books published by a specific publisher.

8. The following tables are maintained by a book dealer

AUTHOR (author-id: int, name: string, city: string, country: string)

PUBLISHER (publisher-id: int name: string, city: string, country: string)

CATLOG (book-id: int, title: string, author-id: int, publisher-id: int, category: int, year: int, price: int)

CATEGORY (category-id: int, description: string) ORDER-DETAILS (order-no: int, book-id: int, quantity: int)

a) Create above tables by properly specifying the primary keys and the foreign keys.

b) Enter at least five tuples for each relation.

c) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2010.

d) Find the author of the book which has maximum sales.

e) Demonstrate how to increase price of books published by specific publisher by 10%

9. Consider the following database for BANK.

BRANCH (branch-name: string, branch-city: string, assets: real)

ACCOUNT (accno: int, branch-name: string, balance: real)

DEPOSITOR (customer-name: string, accno: int)

CUSTOMER (customer-name: string, customer-street: string, customer-city: string)

LOAN (loan-no: int, branch-name: string, amount: real)

BORROWER (customer-name: string, loan-no: int)

a) Create the above tables by properly specifying the primary keys and foreign keys.

b) Enter at least five tuples for each relation.

c) Find all the customers who have at least two accounts at the main branch.

d) Find all customer who have an account at all the branches located in a specific city.

e) Demonstrate how t0 delete all account tuples at every branch located in specific city.

10. Consider the following database for ORDER PROCEESING.

CUSTOMER (cust_no: int, cname: string, city: string)

ORDER (order_no: int, odate: date, ord_amt: real)

ORDER_ITEM (order_no: int, itemno:int, qty: int)

ITEM (itemno: int, unitprice: real)

SHIPMENT (orderno: int, warehouseno: int, ship-date: date)

WAREHOUSE (warehouseno: int, city: string)

a) Create the above tables by properly specifying the primary keys and the foreign keys

b) Enter at least five tuples for each relation.

c) List the order number and ship date for all orders shipped from particular warehouse.

d) Produce a listing: customer name, no of orders, average order amount

e) List the orders that were not shipped within 30 days of ordering

11. THE FOLLOWING RELATIONS KEEP TRACK OF AIRLINE FLIGHT INFORMATION:

Flights (no: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)

Aircraft (aid: integer, aname: string, cruisingrange: integer)

Certified (eid: integer, aid: integer)

Employees (eid: integer, ename: string, salary: integer)

a) Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80, 000.

b) For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified.

c) Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.

d) For all aircraft with cruisingrange over 1000 Kms, Find the name of the aircraft and the average salary of all pilots certified for this aircraft.

e) Find the names of pilots certified for some Boeing aircraft. vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

12. INVENTORY DATABASE An inventory database has the following tables

ITEM (ItemCode: number, ItemName: text, Price: number (10,2))

PURCHASE (ItemCode: number, Quantity: number)

a. Create above table with above attributes.

b. Enter 5 – 7 tuples into the tables.

c. List the items purchased

d. Display the total items purchased (listing must have the columns: ItemCode ItemName Total Quantity)

e. List the items which are not purchased by anyone.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 8 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

BCA301T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA302T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA303T: OBJECT ORIENTED PROGRAMMING USING C++

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit-I   **12 Hours**

Introduction :Procedure Languages, definition of OOP, Basic concept of OOP, Object Class, Data Abstraction, Data Encapsulation, Data Hiding member functions , Reusability, Inheritance, Creating new Data Types, Polymorphism, Overloading , Dynamic binding and Message passing. C++ Features: The iostream class, C++ Comments, C++ Keywords, Variable declaration, The Const Qualifier. The Endl, Set Waste precision, Manipulators, The scope resolution operator, The new & delete Operations. Functions: Simple Functions, Function declaration, calling the function, function definition, Passing argument to, returning value from function, passing constants, Variables, pass by value , passing structure variables, pass by reference, Default arguments, return statements, return by reference, overloaded functions; Different number of arguments, Different Kinds of argument, inline function.

Unit-II   **12 Hours**

Objects & Classes: Classes & Objects, Class Declaration, Class member; Data Constructions, Destructors, Member functions, Class member visibility, private, public and protected. The scope of the class objects constructions, Default Constructor. Constructor with argument, constructor with default arguments, Dynamic constructor, copy constructor, Overloaded constructor, Objects as arguments returning objects from functions, class conversion, manipulation private Data members, Destructors classes, object & memory, arrays as class member data: Array of objects, string as class member.

Unit-III   **12 Hours**

Operator Overloading : Overloading unary operator: Operator Keyword, Operator arguments, Operator return value, Nameless temporary objects, limitations of increment operator, overloading binary operator, arithmetic operators, comparison operator, arithmetic assignment operator, data conversion; conversion between objects of different classes. Inheritance : Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, Derived class constructor, Overriding member functions, public and private inheritance; Access Combinations, Classes & Structures, Access Specifiers, Level of inheritance; Multilevel inheritance, Hybrid inheritance, Multiple inheritance; member functions in multiple inheritance , constructors in multiple inheritance, Containership; Classes, within classes, Inheritance & Program development.

Unit-IV   **12 Hours**

Virtual functions: Normal member function accessed with pointers, Virtual member functions accessed with pointers, Dynamic binding, pure virtual functions, Friend function; Friends for functional notation, friend classes, the pointer; Accessing Member Data with this, using this for returning values. Templates & Exception Handling: Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling.

Unit-V   **12 Hours**

Streams: The Stream class Hierarchy, Stream classes Header file, string I/O: Writing strings, reading strings, character I/O, Detecting End – of – file. Object I/O; writing an object to disk, reading an object from disk, I/O with multiple objects; the fstream class, The open function, File Pointers; Specifying the position, Specifying the offset. The tellg Function, Disk I/O with Memory Functions; Closing Files, Error Handling, Command Line Arguments.

Text books:
1. Lafore Robert, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2012.

Reference:

1. Lippman, "C++ Primer", 3rd Edition, Pearson Education, 2010.

2. E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill Publications, 2011.

3. Farrell, "Object Oriented Programming Using C++", 1st Edition 2008, Cengage Learning India

BCA304T: ACCOUNTING AND FINANCIAL MANAGEMENT

Total Teaching Hours: 52   **No of Hours / Week : 04**

Unit - I   **12 Hours**

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   **10 Hours**

Financial Accounting Process: Classification of accounting transaction and accounts, rules of debit and credit as per Double Entry System. Journalisation and Ledger position Preparation of different subsidiary books: Purchase Day Book Sales Day Book, Purchase Returns Day Books, Sales Returns Day Book, Cash Book. Bank Reconciliation Statement: Meaning, Need, Definition, preparation of BRS.

Unit - III   **10 Hours**

Accounting for bill of exchange: Meaning, Need, Definition, Partice to Bill of Exchange, Types of Bills. Accounts Procedure: Honour of the Bill, Dishonour of the Bill, Endorsement, Discounting, Renewal, Bills for collection, Retirement of the Bill, Accommodation Bills, Bill

Receivable Book and Payable Book. Preparation of Trial Balance: Rectification of errors and journal Proper.

Unit – IV   **10 Hours**

Preparation of Final accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance-Sheet of sale –traders and partnership firms.

Unit - V   **10 Hours**

Accounting Package like Tally

Text Book
    1. S.Ramesh, B.S.Chandrashekar, a Text Book of Accountancy.
References
1. V.A.Patil and J.S.Korihalli, Book–Keeping and Accounting, (R. Chand and Co. Delhi).
2. R.S.Singhal, Principles of Accountancy, Nageen Prakash pvt.Ltd, Meerut.
3. B.S.Raman, Accountancy, (United Publishers, Mangalore)

BCA305T: OPERATING SYSTEMS

Total Teaching Hours: 65   **No of Hours / Week : 05**

Unit - I   **13 Hours**

Introduction: Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems, Operating System Structures, Components & Services, System calls, System programs, Virtual machines. Process Management: Process Concept, Process Scheduling, Co – Operating process, Threads, Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling, Real time Scheduling, Algorithm evolution.

Unit - II   **13 Hours**

Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock, Combined approach to deadlock handling.

Unit - III   **13 Hours**

Memory Management: Logical and Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging in Mastics and Intel 386, Virtual memory-Demand paging and it's performance, Page replacement algorithms, Allocation of frames, thrashing, page size and other considerations. Demand Segmentation.

Unit – IV   13 Hours

File management (Systems, Secondary Storage Structure): File Concepts, Access methods, Directory Structure, Protection and consistency, File system structure, Allocation methods,

Free space management, Directory Implementation, Efficiency and Performance, Recovery. Disk Management (Structure, Disk Scheduling Methods): Disk Structure & Scheduling methods, Disk management, Swap – Space management.

Unit - V   13 Hours

Protection and Security: Goals of protection, Domain Protection, Access matrix, Security Problem, Authentication, One time password, program threats, System threads.

Case Study of Windows and Linux Operating System

BCA303P : C++ PROGRAMMING LAB

PART - A

1. Write a C++ Program to define a STUDENT class with USN, Name and Marks in 3 tests of subject. Declare an array of 1O STUDENT objects. Using appropriate functions, find the average of two better marks for each student. Print the USN, Name and average marks
2. Write a C++ Program to Deposit amount and withdraw options in bank transactions for saving and current account and display the total balance using friend functions.
3. Write a C++ Program to find the area of right angle, equilateral and scalene triangle using function overloading.
4. Write a C++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a COMPLEX number.
i. ADD(a , s2) - where a is an integer (real part) and s2 is a complex number.
ii. ADD(s1, s2) - where s1 and s2 are complex numbers.
5. Write a C++ Program to compare two strings by overloading = = operator.
6. Write a C++ Program to perform addition of two matrices by overloading + operator.
7. Write a C++ Program to create a class called STUDENT with data members USN, Name and Age. Using inheritance, create the class MARKS containing data members for 3 subjects, percentage and create another class called SPORTS having data members name of the sport, achievements. Enter the data for at least 5 students. Display student details, percentage and sport details for all the students separately.
8. Write a C++ Program to sort elements using bubble sort technique applying function templates.
9. Write a C++ Program to perform stack operations for Integers, Decimal, Characters using class templates.
10. Write a C++ Program to calculate area and perimeter of rectangle using concept of inheritance.
11. Write a C++ Program to calculate area and volume of various figures using function overriding.
12. Write a C++ Program to perform open, read and write operations on a file. Copy the contents of one file to other without loosing the data in the destination file and count how many characters are there in the destination file.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

BCA304P: ACCOUNTING PACKAGE LAB

Tally Lab List

Part A

10 Programs

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

SYLLABUS

IV SEMISTER

BCA401T: INDIAN LANGUAGE

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA402T: ENGLISH

Syllabus as per the one prescribed for science courses of Bangalore University.

BCA403T: VISUAL PROGRAMMING.NET

Total Teaching Hours: 52   **No of Hours / Week: 04**

UNIT 1: Introduction to .net framework -Features, Common Language Runtime (CLR), Framework Class Library(FCL). Common Language Specification (CLS), Common Type System (CTS), Intermediate Language (IL) and Just-In-Time (JIT) Compilation, Visual Studio.Net – IDE, Languages Supported, Components.
VB.Net Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window.

UNIT 2: VB.Net Creating Applications with Visual Basic.NET, Variables, Constants, and Calculations, Making Decisions and Working with Strings, Lists, Loops, Validation, Sub Procedures and Functions, Multiple Forms, Standard Modules, and Menus, Arrays, Timers, Form Controls, File Handling, Exception Handling, Working with Databases, Advanced Database Programming using ADO.net, Classes, Generics, Collections, Inheritance, Custom Controls, Packaging & deployment, Using Crystal Reports.

UNIT 3: Programming in Visual basic .Net Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements- If- Then, If-Then-Else, Nested If, Select Case, Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays-Static and Dynamic. - Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures.

UNIT 4: ASP.NET Building a Web Application, Examples Using Standard Controls, Using HTML Controls, Validating Form Input Controls using Validation Controls, Understanding Applications and State, Applying Styles, Themes, and Skins, Creating a Layout Using Master Pages, Binding to Databases using Controls, Data Management with ADO.net, Creating a Site Navigation Hierarchy, Navigation Controls , Membership and Role Management, Login Controls, Securing Applications, Caching For Performance, Working with XML, Using Crystal Reports in Web Forms.

UNIT 5: Databases: Introduction, Using SQL to work with database, retrieving and manipulating data with SQL, working with ADO.NET, ADO.NET architecture, ASP.NET data control, data source control, deploying the web site. Crystal reports. LINQ: Operators, implementations, LINQ to objects, XML, ADO.NET, Query Syntax. Stored Procedures

Text Books:

1. Visual Basic.Net Black Book by Steven Holzner Dreamtech Press

2. The Complete Reference Visual Basic .NET Jeffery R. Shapiro Tata McGraw Hills

Reference Books:

1. Visual studio 2010 - A beginners guide - Joseph Mayo

2. Murach's Beginning Visual basic .Net By Anne Bohem

3. Programming Visual Basic .NET Dave Grundgeiger Publisher: O'Reilly First Edition January 2002

BCA404T: UNIX PROGRAMMING

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit - I   **12 Hours**

Introduction: History, salient features, Unix system architecture, Unix command format, Unix internal and external commands, Directory commands, File related commands, Disk related commands, general utilities. Unix File System: Boot inode, super and data block, in-core structure, Directories, conversion of pathname to inode, inode to a new file, Disk block allocation. Process Management: Process state and data structures of a Process, User vs, kernel node, context of a Process, background processes, Process scheduling commands, Process terminating and examining commands.

Unit - II   **10 Hours**

Secondary Storage Management: Formatting, making file system, checking disk space, mountable file system, disk partitioning, file compression. Special Tools and Utilities: Filters, Stream editor SED and AWK, Unix system calls and library functions, Processes, signals and Interrupts, storage and compression facilities.

Unit - III   **10 Hours**

Shell Programming: vi editor, shell types, shell command line processing, shell script features, executing a shell script, system and user-defined variables, expr command, shell screen interface, read and Eco statement, command substitution, escape sequence characters, shell script arguments, positional parameters, test command, file test, string test, numeric test.

Unit – IV   **10 Hours**

Conditional Control Structures-if statement, case statement Looping Control Structure-while, until, for, statements. Jumping Control Structures – break, continue, exit. Shell Programs covering the above concepts.

Unit - V   **10 Hours**

Unix System Communication: Introduction, write, read, wall commands, sending and handling mails. System Administration: Roles of a System Administrator, File System Maintenance, System Startup and Shutdown, User Management, Backup and Restore, Doemons, Domain Name System DNS, Distributed File System.

BCA405T: SOFTWARE ENGINEERING

Total Teaching Hours: 65   **No of Hours / Week: 05**

Unit - I
Introduction: Software Products and Software process, Process models: Waterfall modal, Evolutionary Development, Bohemia's Spiral model, Overview of risk management, Process Visibility, Professional responsibility. Computer based System Engineering: Systems and their environment, System Procurement, System Engineering Process, System architecture modelling. Human Factors, System reliability Engineering. Requirements and Specification: The requirement Engineering Process, The Software requirement document, Validation of Evolution of requirements, Viewpoint – oriented & method based analysis , system contexts , Social 7 organizational factors . Data flow , Semantic, Objects, models , Requirement Specification, Non functional requirement. [13 Hours]

Unit - II
Software Prototyping: Prototyping in software process, Prototyping techniques, User interface prototyping. Software Design: Design Process, Design Strategies, Design Quality , System Structuring control models, Modular decomposition , Domain Specific architecture.
[13 Hours]

Unit - III
Object Oriented& function oriented design: Objects, object Classes and inheritance Object identification, An object oriented design example, Concurrent Objects, Data flow design Structural decomposition, Detailed Design, A Comparison of design Strategies.
User interface design: Design Principles, User System interaction, Information Presentation, User Guidance, Interface Evaluation. [13 Hours]

Unit - IV
Software Reliability and reusability : Software reliability metrics , Software reliability Specification , Statistical testing ,Reliability Growth modeling, Fault avoidance & tolerance, Exception handling & defensive programming , Software development with reuse, Software' development for reuse , Generator based reuse, Application System Portability. [13 Hours]

Unit - V

Software Verification and Validation : The testing Process , Test Planning & Strategies, Black Box , Structural, interface testing , Program inspections , Mathematically based verification, Static analysis tools, Clean room software development. Management Issues: Project management, Quality management, Software cost estimation, Software maintenance. [13 Hours]

Text book

1. Ian Sommerville – Software Engineering, 9th Edition, Pearson Education Ltd, 2010.

Reference Books

1. Roger S. Pressman – Software Engineering, A Practitioner's approach, 7th Edition, McGRAW-HILL Publication, 2010.
2. Pankaj Jalote, "An integrated approach to Software Engineering", 3rd Edition, Narosa Publishing House, 2013

UNIX AND SHELL PROGRAMMING LAB

1. Write a shell script to print all the prime numbers between m to n (m<n).
2. Write a shell script to reverse a given number and check whether it is a palindrome.
3. Write a shell script to find the sum of digits of a given number using loops and without using loops.
4. Write a shell script to implement 10 unix commands using case .
5. Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions?
6. Write a shell script to copy a file
   i) copy file within current directory.
   ii)copy file between two directories.
7. Write a Shell script to create 2 data files and compare them to display unique and common entries.
8. Write a Menu driven shell script to perform the following
   a. To count the number of vowels in a string.
   b. To convert uppercase characters to lowercase and vice versa.
   c. To accept a word and perform pattern matching in a given file.
9. Write awk script to find number of words, characters and lines in a file.
10. Create an emp file containing empname, empno, dept, designation.
    a. Display empname and empno of any particular dept and the count of employees.
    b. Display empname and empno of employees who are not managers.
11. Write a system program to demonstrate fork(),exec(),wait(),exit() system calls to execute ls –l command in the child process.
12. Write a Menu driven program to demonstrate zombie process and orphan process.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks

Execution of one program - 10 Marks

Formatting the Output - 05 Marks

Viva - 05 Marks

Record - 05 Marks

Total - 35 Marks

Vb.NET Lab

Part A

Ten Programs

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks

Execution of one program - 10 Marks

Formatting the Output - 05 Marks

Viva - 05 Marks

Record - 05 Marks

Total - 35 Marks

BCA501T: DATA COMMUNICATIONS AND NETWORKS

Total Teaching Hours : 65   No of Hours / Week : 05

Unit – I

Introduction: Communication Network and services, Approaches to Network Design, Network Functions and Network Topology, Message ,packet and circuit Switching , Internet, Packet Switching ; Key factors in Communication Network Evolution ; Layered Architecture and Applications – Examples of Layering , OSI Reference Model, TCP/IP Model Telnet FTP and IP Utilities. Digital Transmission: Digital Representation of Information: Properties of digital transmission: Characterization of Communication Channels Frequency Domain and Time Domain : Fundamental limits in Digital Communication – The Nyquist Signalling rate, The Shannon channel capacity : Line coding , Modems & digital Modulations [13 Hours]

Unit - II

Transmission Systems: properties of media and digital transmission Systems – Twisted Pair , Coaxial Cable, Optical Fibre, Radio Transmission Intrared Light Error detection and correction – Error detection , Two – dimensional parity checks , Internet checksum , Polynomial code; standardized Polynomial codes , Error detecting capability of a polynomial code, Multiplexing – frequency – Division , Time – Division , SONET; Wavelength Division Multiplexing Circuit switches; Telephone network , signalling Traffic and Overload control in Telephone networks – Concentration, Routing Control, Overload controls Cellular Telephone Networks, Satellite Cellular networks. [13 Hours]

Unit – III

Peer –to-Peer Protocols:- Peer-to peer Protocols and service models ARQ Protocols stop and wait , Go –back-N Selective Repeat , Transmission efficiency of ARQ Protocols, Other adaptation functions , - Sliding window flow control Timing Recovery in Synchronous Services Reliable Stream Service, Data Link Control, HDLC, PPP ; Statistical Multiplexing. [13 Hours]

Unit - IV

Local Area Networks and Medium access Control Protocols:- Multiple access communications; Local Area network – LAN Structure, MAC Sublayer, Logical link control layer, Random Access protocols ALOHA , Slotted ALOHA, CSMA, CSMA/CD, Scheduling

approaches to medium access control – Reservation Systems, polling , Token passing rings, comparison of Random access & Scheduling access control Comparison of Radom access & SHEDULING MEDIUM access controls; Channelization – FDMA, TDMA, CDMA; [13Hours]

Unit - V

LAN Standard –Ethernet and IEF, 802.3 LAN Standard ; Token Ring and IEEE 8025 LAN standard , FDDI, Wireless LAN's and IEEE 802.11 Standards; LAN Bridges – Transparent Bridges , Source Routing Bridges , Mixed – media Bridges. Packet Switching Networks :- Network services & Internal Network Operation; Packet Network Topology; Datagrams & VIRTUAL circuits ; structure of switch/ Router, Connectionless packet switching ; Virtual – Circuit packet switching ; Overview of Routing and congestion in packet networks – Routing algorithms classification , Routing tables, shortest path routing algorithms, Flooding , Hierarchical routing , Distance vector routing Link state routing , congestion control algorithms. [13 Hours]

Text Books:
1. Stallings, "Data and Computer Communications", 7th Edition,Pearson Education, 2012

Reference Books:
1. Andrew S Tanenbaim, "Computer Networks", 4th Edition, Pearson Education.
2. Behrouz Ferouzan, Introduction to Data Communication & Networking TMH, 1999.
3. Larry &Peterson & Bruce S Davis; Computer networks Second Edition , Morgan Kaufman, 2000.

BCA502T – Artificial Intelligence

Total Teaching Hours: 65   No. of Hours / Week: 05

UNIT-I [13 Hours]
Introduction to Artificial Intelligence: Definition, AI Applications, AI representation, Properties of internal Representation, Heuristic search techniques. Best first search, mean and end analysis, A* and AO* Algorithm, Game Playing, Minimize search procedure, Alpha beta cutoffs.

UNIT-II [13 Hours]
Knowledge representation using predicate logic: predicate calculus, Predicate and arguments. Knowledge representation using non monotonic logic: TMS (Truth maintenance system), statistical and probabilistic reasoning, fuzzy logic, structure knowledge representation, semantic net, Frames, Script, Conceptual dependency.

UNIT-III [13 Hours]
Planning: block world, strips, Implementation using goal stack, Non linear planning with goal stacks, Hierarchical planning, list commitment strategy. Perception: Action, Robot Architecture, Vision, Texture and images, representing and recognizing scenes.

UNIT-IV [13 Hours]
Learning: Learning as induction matching algorithms. Failure driver learning, learning in general problem solving concept learning. Neural Networks: Introduction to neural networks and perception-qualitative Analysis only, neural net architecture and applications.

UNIT-V [13 Hours]
Natural language processing and understanding and pragmatic, syntactic, semantic, analysis, RTN, ATN, understanding sentences. Expert system: Utilization and functionality, architecture of expert system, knowledge representation, two case studies on expert systems.

Reference
1. E. Charnaik and D.McDermott," Introduction to artificial Intelligence", Pearson Education, 2012.
2. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI,

2013.

3. E. Rich and K. Knight," Artificial Intelligence", Tata McGraw Hill, 2013.

4. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co. 2002.

5. M.Timjones "Artificial Intelligence a Systems Approach" University Science Press 2010

BCA503T- JAVA PROGRAMMING

Total Teaching Hours: 52   No. of Hours / Week: 04

Unit - I

Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, 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. Decision Making and Looping: Introduction. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops. [12 hours]

Unit -II

Classes, Arrays, Strings and Vectors: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes. [10 Hours]

Unit - III

Interfaces, Packages, and Multithreaded Programming: Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. [10 Hours]

Unit - IV

Managing Exceptions, Applet Programming: Managing Errors and Exception: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging. Applet Programming: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input from the User. [10 Hours]

Unit - V

Graphics Programming, Input/Output: Graphics programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes. [10 Hours]

Text Books:

1. A.Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.
2. P Radha Krishna, "Object Oriented Programing through JAVA", University Press, 2017

Reference Books:

1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.

2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.

3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.

4. Schildt, "JAVA The Complete Reference", 7th Edition.

BCA504T- Analysis and Design of Algorithm

Total Teaching Hours: 52   No. of Hours / Week: 04

Unit 1 Introduction: Definition of algorithm, Characteristic of algorithm, Different Control Structures, Writing Structured Programs, Analysis of algorithm   (12 hrs)

 Unit 2 Divide and Conquer: General Method, Binary Search, Finding Maximum & Minimum., Merge Sort, Quick Sort.   (10 hrs)

Unit 3 Greedy Method: General method, Knapsack Problem, Job Sequencing with deadline, Minimum – cost Spanning trees, Single – Source Shortest Paths   (10 hrs)

Unit 4 Dynamic Programming: Introduction to Graphs, Definition types, Terms related to graph, General Method, Multistage Graphs, All pair Shortest Paths, 0/1 – knapsack, The traveling salesperson problem, Flow Shop Scheduling.   (10 hrs)

Unit 5 Basic traversal & Search techniques: Search & traversal techniques for trees, Search & traversal techniques for graphs.

 Backtracking: General method, The 8- Queens Problem, Sum of subsets, Graph Coloring.

(10 hrs)

Text books:

1. Aho Ullman & Hopkraft "Design & analysis of Algorithms".

2.   Sara Baase, Allen Van Gelder, Computer Algorithms , Introduction to design and Analysis, 3rd edn (9th reprint), Pearson, 2005.

3.   Design & Analys of alogorithm- Horowitz & Sahni 4.   Fundamentals of Computer algorithm – Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran.

References: 1. Berman : Algorithms , 1st Edition 2008, Cengage Learning India

BCA505T-Elective 1

Total Teaching Hours: 65   No. of Hours / Week: 05

BCA503P- JAVA PROGRAMMING LAB

BCA504P- ANALYSIS AND DESIGN OF ALGORITHM LAB

Part A 10 Programs

Part B

BCA505P-PROJECT

> The Project work should be carried out in groups. Each group shall not exceed three members.

SIXTH SEMISTER

BCA601T: SYSTEM PROGRAMMING

Total Teaching Hours: 65   No. of Hours / Week: 05

Unit - I   **13 Hours**

Background: Machine Structure, Evolution of the Components of a Programming System, Assembler, Loaders, Macros, Compliers, Formal Systems. Machine Structure, Machine Language and assembly language: General Machine Structure, Machine Language, Assembly Language

Unit - II   **13 Hours**

Assemblers: General Design Procedure, Design of assembler, Statement of Problem, Data structure, Format of databases, algorithm, look for modularity, Table Processing: Searching and Sorting. The Problem, Searching a table, linear Search, binary Search, Sorting, interchange sort, Shell Sort, Bucket Sort, Radix Exchange Sort, address calculation sort, comparison of sorts, hash or random entry searching.

Unit - III   **13 Hours**

MACRO LANGUAGE AND THE MACRO PROCESSOR: Macroinstruction, Features of macro Facility, Macro instruction arguments, conditional macro Expansion, macro calls within macros, macro Instructions defining macros, Implementation, Statement of problem, implementation of a restricted facility, A two pass algorithm. A single pass algorithm, implementation of macro calls within macros. Implementation within an assembles.

Unit – IV   **13 Hours**

LOADERS: Loader schemes, Compile & go, General loading Scheme, absolute loaders, Subroutine Languages, Relocating loaders, Direct linking loaders, other loading Schemes – Binders, linking loaders, Overlays, Dynamic binders. Design of absolute loader, Design of a Direct linking loader Specification of problem, Specification of data structure, format of data bases algorithm.

Unit - V   **13 Hours**

COMPILERS: Statement of problem, Problem1: Recognizing basic Elements, Problem2: Recognizing Syntactic cutis & interpreting meaning, Problem3: Storage Allocation, Problem4: Code Generation. Optimization (machine independent) optimization (machine dependent), Assembly Phase, General Model of complier. PHASES OF COMPILERS: Simple Structure of Compiler, Brief introduction to 7 Phases of Compliers.

BCA602T: PROFESSIONAL AND BUSINESS COMMUNICATION

Total Teaching Hours: 65   **No of Hours / Week: 05**

BCA603T: WEB PROGRAMMING

Total Teaching Hours: 52   **No of Hours / Week: 04**

Unit - I   **12 Hours**

Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables.

Unit - II   **10 Hours**

HTML and XHTML: Forms, Frames in HTML and XHTML, Syntactic differences between HTML and XHTML. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The <span> and <div> tags, Conflict resolution.

Unit - III   10 Hours

Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.

Unit – IV   10 Hours

Java Script and HTML Documents: The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification.

Unit - V   10 Hours

Dynamic Documents with JavaScript: Introduction to dynamic documents; Positioning elements; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; Dragging and dropping elements. XML: Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML Processors; Web services.

BCA604T: ELECTIVE-2

Total Teaching Hours: 65   No. of Hours / Week: 05

BCA605P: WEB PROGRAMMING LAB

1 Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
2 Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
3 Create a page with dynamic effects. Write the code to include layers and basic animation.
4 Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
5 Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
6 Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
7 Create a form consists of a two Multiple choice lists and one single choice list (a) The first multiple choice list, displays the Major dishes available (b) The second multiple choice list, displays the Starters available. (c)The single choice list, displays the Soft drinks available.
8 Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

9 Write a program to convert lowercase string to uppercase string.

10 Write a program to validate username and password

11 Create a web page to display mouse position.

12 Write a program to replace string using regular expression.

PART – B

During practical examination the External and Internal examiners may prepare exam question paper related to theory syllabus apart from Part-A. (A minimum of 8 Programs has to be prepared).

Note:

a) The candidate has to write two the programs One from Part-A and other from Part-B and execute one program as of External examiner choice.

b) A minimum of 10 Programs has to be done in Part-B and has to be maintained in the Practical Record.

c) Scheme of Evaluation is as follows:

Writing two programs - 10 Marks
Execution of one program - 10 Marks
Formatting the Output - 05 Marks
Viva - 05 Marks
Record - 05 Marks
Total - 35 Marks

BCA605P: PROJECT WORK

Guidelines for Project Work

The objective of the project is to motivate students to work in emerging/latest technologies, help the students to develop their ability by applying theoretical knowledge and practical techniques to solve real life problems related to industry, academic and research field.

Students are expected to do planning, analysis, design, code and implementation of the project. The initiation of project should be with the project proposal. The Project work should be done in a group not more than two members.

The project carries 300 marks is distributed as follows:

* Internal Marks:100

(Note: Implemented project will be given full internal Marks)

* External Marks: 200

o   Demonstration and Presentation 130 Marks
o Viva-voce 50 Marks
o Project Report 20 Marks