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Syllabus of BCA (w.e.f 2020-2021)

Semester 1

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment
1	BCA101	Computer fundamental and PC Software	80	20
2	BCA102	Introduction to C Programming	80	20
3	BCA103	Mathematics-I	80	20
4	BCA104	Principles of Accounting	80	20
5	BCA105	English Language and Communication	80	20
6	BCA106	Software Lab –I (PC Software)	**80**	**20**
7	BCA107	Software Lab –II (Programming in C)	**80**	**20**

Semester 2

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment
1	BCA201	Digital Logic	80	20
2	BCA202	Data Structure with C Language	80	20
3	BCA203	Mathematics-II	80	20
4	BCA204	Computer Network	80	20
5	BCA205	Database Management System	80	20
6	BCA206	Digital Electronics Lab	**80**	**20**
7	BCA207	Software Lab-III (DBMS and Data Structure Lab)	**80**	**20**

Semester 3

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment
1	BCA 301	Operating System	80	20
2	BCA 302	Computer Organization and Architecture	80	20
3	BCA 303	Object Oriented Programming using C++	80	20
4	BCA 304	Mathematics-III	80	20
5	BCA 305	Unix and Shell Programming	80	20

| 6 | BCA 306 | Software Lab-IV(Programming in C++) | 80 | 20 |
| 7 | BCA 307 | Software Lab – V (Unix and Shell Program) | 80 | 20 |

Semester 4

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment
1	BCA 401	Software Engineering	80	20
2	BCA 402	Introduction to Microprocessor	80	20
3	BCA 403	Internet and E- commerce	80	20
4	BCA 404	Java programming	80	20
5	BCA 405	Computer Graphics	80	20
6	BCA 406	Software Lab- VI(Java Programming)	80	20
7	BCA 407	Software Lab- VII(Assembly Language Programming(8085), Graphics Programming using C).	80	20

Semester 5

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment
1	BCA501	System Software	80	20
2	BCA502	PHP Programming	80	20
3	BCA503	Python Programming	80	20
4	BCA 504	Principles of Management	80	20
5	BCA 505	Intelligent Systems	80	20
6	BCA506	Software Lab- VIII(PHP Programming Lab)	80	20
7	BCA507	Software Lab- IX(Python Programming)	80	20

Semester 6

Sl. No.	Course Code	Course Title	Semester End Examinations	Internal Assessment

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1	BCA 601	Elective I	80	20
2	BCA 602	Elective II	80	20
3	BCA 603	Major Project & Viva	80	20

Elective 1:

(i) Theory of Computation
(ii) Image Processing

Elective 2:

(i) Web Programming and .NET Technology
(ii) Advance Networking & Communication

Semester - I

BCA 101: Computer Fundamental and PC Software
Theory: 60 Lectures

Introduction – Introduction to computers – Evolution – Generation of Computers – Computers Hierarchy – Applications of Computers – Number System – Binary, Hexa, Octal, BCD System - Boolean Algebra – laws – logic gates – simplification of Boolean expression – k-map – sum of products – product of sums..

(50%)

Windows Basics – Introduction to word – Editing a document - Move and Copy text - Formatting text & Paragraph – Enhancing document – Columns, Tables and Other features.   (10%)

Introduction to worksheet and shell – getting started with Excel – Editing cell & using Commands and functions – Moving & Copying , Inserting & Deleting Rows & Columns - Printing work sheet.

Creating charts – Naming ranges and using statistical, math and financial functions, database in a worksheet – Additional formatting commands and drawing toolbar – other commands & functions – multiple worksheet and macros.   (25%)

Overview of Power point – presenting shows for corporate and commercial using Power point – Introduction to Desktop publishing – Computer viruses – Introduction to Internet – Web features.

(15%)

TEXT BOOKS:

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1. Computer Fundamentals – Raja Raman – Prentice Hall of India .
2. Digital Circuits & Design – S.Salivahanan, S.Arivazhagan – Vikas Publishing House Pvt Ltd.
3. Digital logic & Computer Design- M.Mano- Prentice Hall of India

BCA 102: Introduction to C Programming
Theory: 60 Lectures

Introduction to computers and operating environment	[4%]
Program development cycle	[2%]
Algorithm - Representation of Algorithms	[4%]
Pseudocode	[2%]
Flowchart & Decision tables	[2%]
Structured Programming and Modular Programming	[4%]
Introduction to C	[10%]

Data Types and sizes, variable declaration, operators, type conversion, conditional expressions, special operators, precedence rule.   [12%]

Control Structures- statements and blocks, if, switch, while, for, do-while, break, continue, goto and labels.   [20%]

Functions & Program structure ,recursion, arrays and pointers, structures and unions, standard I/O, formatted I/O, standard library functions.   [20%]

Files handling and pre-processing.	[10%]
String processing in C.	[10%]

Books:

1. Programming in C-B.S. Gottfried (Sahaum Series)

2. Programming in ANSI C- E. Balaguruswami (TMH)

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BCA 103: Mathematics-I

Theory: 60 Lectures

Algebra: Sets, Union and Intersection, Complement, Mapping, Composition, notion of a Group, Ring

, Field with simple examples.   [20%]

Complex Number: Modulus and amplitude, De Moiver's theorem   [5%]

Polynomials, Division algorithm, Fundamental theorem of classical algebra (Proof not required), Descartes rule of sign and their application, Relation between roots and coefficients; symmetric function of roots, Transformation of polynomial equation, Cardon's solution of cubic equation, Determinants, Addition and Multiplication of Matrices, Inverse of a Matrix ; Solution of linear equations in three variables by Cramer's rule and solution of three line linear equations by matrix inversion methods.   [30%]

Vector spaces, Subspaces, Bases and Dimensions, Co-ordinates, Linear Transformation, The Algebra of Linear Transformations.

Vector Algebra: Scalars & vectors, vector addition, linear combination of vectors, condition of colinearity of three points, scalar and vector products, scalar triple product and vector triple product.

                                                                                        [15%]

Analytical Geometry: Translation and rotation of rectangular axes, invariants, general equation of second degree-reduction to standard forms and classification. Plane polar equation of a straight line, circle, ellipse, parabola and hyperbola.   [30%]

Books:

1.   A Text book of Algebra- B.K. Lahiri & K. C. Roy

2.   Linear Algebra- Das & Roy

3.   Co-ordinate Geometry- S. L. Loney

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4. Differential Calculus- Das and Mukherjee

5. Integral Calculus - Das and Mukherjee

BCA 104: Principles of Accounting

Theory: 60 Lectures

Basic Accounting and Conventions underlying preparation of Financial statements (balance sheet highlighting accounting process, basic accounts, trial balance and financial statements, issue such as provisions for bat debts tax, dividends, losses such as bad debts, missing information, classification effects, cost of assets, rentals etc.), income measurement (revenue; recognition and matching costs and revenues;

inventory   valuation);depreciation   accounting; intangible assets accounting;   understanding published annual accounts including fund flow statements.   [70%]

Basic Cost Concepts (Introduction; Cost Classification; Allocation, Appointment and Absorption; Cost Centres); Cost Analysis for Managerial Decisions (Direct Costing, Break-Even Analysis; Relevant Fixed Costs and Sunk Costs). Cost Analysis for Control (Standard Costing; Variences; Material, Labour; Overhead, Sales and Profit).   [20%]

Standard Cost accounting (Budgeting and Control; Elements of Budgeting; Control of Manufacturing and Manufacturing Expenses; Performances Appraisal, Evaluation of Cost Control Systems).   [10%]

BCA 105: English Language and Communication

Theory: 60 Lectures

Objectives:

i)   To develop the learners' language skills in English- Listening, Speaking, Reading and Writing (LSRW)

ii)   To develop the learners' specific skills for communication in the fields of Science, Technology and Computer Applications

Course Content:

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Communication and communicative activities the notions of encoder and decoder and the message and the medium. [30%]

Communicative competence

- Concise grammatical structures and key vocabulary for general as well as specific purposes accuracy and appropriateness in the use of English.
- English speech sounds and sound combinations.
- Elements of spoken English-Topic of discourse, mode of discourse and style of discourse with special reference to scientific discourse. [30%]
- Writing notes, reports, proceedings
- Narrating and describing [30%]
- Practicum on all language activities and communicative tasks-group discussion – seminar.

[10%]

BCA 106: Software Lab-I(PC Software)

Practical

DOS: Introduction to DOS, internal and external commands, batch files (Autoexec.bat, config.sys), Line editors.

MS Windows: History of windows and Windows 95, Desk top cell user interface action, icon on desktop, closing windows, renaming icons, resizing windows(maximizing and minimizing), control panel.

MS Word: Overview, creating, saving, opening, importing, exporting, and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size, editing, positioning, viewing texts, searching and replacing text, inserting page breaks, page numbers, bookmarks, symbols, and dates. Using tabs and tables, header, footer, and printing,

MS Excel: Worksheet overview, entering information, worksheet creation, opening and saving workbook, formatting numbers and texts, protecting cells, producing charts, and printing operations. MS Access: Introduction, understanding databases, creating tables, queries, forms, reports, adding graphs to your reports.

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PowerPoint: Slide creation with PowerPoint.

BCA 107: Software Lab-II (Programming in C)

Practical

Program should be developed in C to implement the problems related to BCA-102 like:

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+……
4. WAP to compute the sum of the first n terms of the following series S =1-2+3-4+5…………….
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

    *

    ***

    *****

    ****

10. WAP to perform following actions on an array entered by the user:

    i) Print the even-valued elements

    ii) Print the odd-valued elements

    iii) Calculate and print the sum and average of the elements of array

    iv) Print the maximum and minimum element of array

v) Remove the duplicates from the array

vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
16. Write a menu driven program to perform following operations on strings:
    a. Show address of each character in string
    b. Concatenate two strings without using strcat function.
    c. Concatenate two strings using strcat function.
    d. Compare two strings
    e. Calculate length of the string (use pointers)
    f. Convert all lowercase characters to uppercase
    g. Convert all uppercase characters to lowercase
    h. Calculate number of vowels
    i. Reverse the string
17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration
19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration
20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation):

    a)   Sum b) Difference c) Product d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective

information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:

    a)   Calculate surface Area

    b)   Calculate Volume

    c)   Increment, Overload ++ operator (both prefix & postfix)

    d)   Decrement, Overload -- operator (both prefix & postfix)

    e)   Overload operator == (to check equality of two boxes), as a friend function

    f)   Overload Assignment operator

    g)   Check if it is a Cube or cuboid

   Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format:

   Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

Semester - II

BCA 201: Digital Logic

Theory: 60 Lectures

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Number systems: Positional number systems; Binary, Octal , Hexadecimal and Decimal number systems; conversion of a number in one system to the other; Representation of signed numbers- signed magnitude, one's complement, 2's complement representation techniques, Merits of 2's complement representation scheme; Various binary codes- BCD, excess -3, Gray code; Binary arithmetic- addition, subtraction, multiplication and division of unsigned binary numbers. [5%]

Logic gates: Basic logic operations- logical sum(or), logical product (AND), complementation (not), Anti coincidence (EX-OR)and coincidence (EX-NOR) operations: Truth tables of Basic gates; Boolean Variables and Expressions; Demorgan's theorem; Universal gates- NAND and NOR; Boolean expressions Simplification- Algebraic technique, Karnaugh map technique, 3 variable and 4 variable Karnaugh map. [15%]

Combinational Circuits: Half adder, full adder, binary magnitude comparator, adder /subtractor circuits, multiplexer and demultiplexer circuits, BCD adder/ subtractor; ALU; parity generators, code converters, priority encoders, PLAs. [30%]

Sequential circuits: flip- flops, - RS, clocked RS, D, JK, T flipflops,: Race condition, Master Slave JK: Registers- universal shift registers; Counters- Binary, decade; modulo-r divider; Practical IC's; Sequential Machine design. [30%]

Memory Circuits- Qualitative discussion of memory circuits; Classification- Read only, read write, Sequential access, random access; ROM- PROM, EPROM; Static and Dynamic RAM (qualitative) ; Basic idea on CCD memory and magnetic memory: CD-ROM: Structure and use. [10%]

Associative memory, cache memory organization, Virtual memory organization.[10%]

Books:

1.   Digital Principles and Applications: Malvino and Leach

2.   Modern Digital Electronics   :   R.P. Jain

3.   Digital Circuits & Design – S.Salivahanan, S.Arivazhagan – Vikas Publishing House Pvt Ltd.

4.   Digital logic & Computer Design- M.Mano- Prentice Hall of India

BCA 202: Data Structure with C Language

Theory: 60 Lectures

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Introduction: Introduction to algorithm, analysis for space and time requirements.   [10%]

Linear data structures and their sequential representation: Array, Stack, queue, circular queue, dequeue and their operation's and applications.   [30%]

Linear data structures and their linked representation: linear linked list, doubly linked list, linked stack and linked queue and their operation's and applications.   [20%]

Nonlinear data structure: Binary trees, binary search trees, representations and operations. Thread representations, sequential representations, graphs, and their representation.   [20%]

Searching: linear search and binary search   [4%]

Sorting: bubble, insertion, selection, quick and merge sort.   [16%]

Books:

1. Data Structure using C- A.M. Tanenbaum (PHI)

BCA 203: Mathematics-II

Theory: 60 Lectures

Differential Calculus: Limit of a function and continuity. Fundamental properties of continuous functions (proofs not required); Derivative and Differential-Geometric meaning, Rules of Differentiation. Successive differentiation.

Rolle's theorem, Mean-Value theorems, Taylor's and Maclaurin's theorems with Cauchy's and Lagrange's forms of remainder; Taylor's series. Functions of several variables. Partial Derivatives. Total Differential. Euler's theorem on homogeneous functions of two variables. Application to plane curves.   [40%]

Integral Calculus: Rules of Integration of Indefinite Integrals, Solution of Definite Integrals and their elementary properties. Idea of improper integrals. [25%] Differential Equations: order, degree, solution and formation of a differential equation. Standard techniques of solving a linear differential equation with constant coefficients. Cauchy's and Ligendre's Liner Differential Equations with variable coefficients.   [20%]

Sequence and Series: Bounded and unbounded sequences, Convergence or divergence of a sequence, Behavior of monotone sequences, Algebra of convergent sequences, Cauchy sequence, Cauchy's

general principle of convergence, Infinite series, it's convergence and sum, series with positive terms and standard tests of convergence (without proofs), Alternating Series, Leibniz Test, Absolute convergence, Rearrangement of absolutely convergent series, Test of convergence of Abel and Dirichlet (without proofs) [15%]

Books:

1. Differential Equations - Sheplay I. (John Wiley & Sons, Inc)

2. Linear Algebra - Kenneth Hoffman & Ray Kunze (PHI)

3. Mathematical Analysis - S. C. Malic (Wiley Eastern Limited)

4. Differential Calculus – Das and Mukherjee

5. Integral Calculus – Das and Mukherjee

BCA 204: Computer Network

Theory: 60 Lectures

Introduction to computer network: Network operating systems, Private, public and value added networks. Introduction to distributed networks.

Structure of computer network, point-to-point multidrop circuits, Data flow and physical circuits, network topologies, topologies and design goals. Hierarchical topology, horizontal topology, star topology, ring topology, mess topology. Telephone network, switched and non switched options, fundamentals of communication theory, channel speed and bit rate. Voice communication and analogue waveforms, bandwidth and frequency spectrum, connecting the analogue and digital world, digital signals, the modem, asynchronous and synchronous transmission. [20%]

Local area networks and wide area networks, connection oriented and connectionless networks, classifications of communication protocols, time division multiple access (TDMA), time division multiplexing (TDM), carrier sense system(collision), token passing, peer-to-peer priority systems, priority slot, carrier sense systems(collision free).

Token passing (priority) systems. Layered Protocols and the OSI model

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Goals of layered protocols, network design problems, communication between layers, introduction to standard organizations and the OSI model, standards organizations, Layers of OSI, OSI status.[25%]

Polling/Selection Protocols: Character and bit protocols, binary synchronous control (BSC), HDLC, HDLC options HDLC frame format, code transparency and synchronization, HDLC transmission process, HDLC subsets, SDLC, protocol conversion. [15%] Local Area Networks: Primary attributes of a LAN, Broadband and baseband and base LANs, IEEE LAN standards, relationship of the 802 standards to the ISI/CCITT model, connection options with LANs, LLC and MAC protocol data units, LAN topologies and protocols, CSMA/CD and IEEE 802.3, token ring (priority), token bus and IEEE 802.4, Metropolitan Area Networks (MANs), ANSI fiber distributed data interface. [20%]

Switching and Routing in Networks: Message switching, packet switching, when and when not to use packet switching, packet routing, packet switching support to circuit switching networks.[10%]

The X.25 and supporting protocols: Features of X.25, Layers of X.25 and the physical layer, X.25 and the data link layer, X.25 standards, X.25 channel options, flow control principles. [5%] TCP/IP: TCP/IP Reference Model and internetworking, example of TCP/IP operations, related protocols, Concept of ports and sockets. [5%]

Books:

1. Black , U., ― Computer Networks- protocols, standards and Interfaces‖ , P.H.I.

2. Stallings, W ., ― Computer Communication Networks‖,P.H.I.

3. Tannembaum , A.S., ― Computer Networks‖, P.H.I.

BCA 205: Database Management System

Theory: 60 Lectures

Concepts of Data Base System   [5%]

Data Base Models: Entity Relationship Model, Record based logical Models (Hierarchical, Network & Relational).   [5%]

Relational Model - Definition & Properties   [5%]

Relational Algebra   [10%]

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SQL   [25%]

Functional Dependency, Normalization(Upto BCNF).   [15%]

Database storage structure, Indexing, Hashing.   [10%]

Security, Integrity, Recovery. Introductory concepts of Distributed Database.   [5%]

Study and use of any one relational database system (ORACLE / MS-SQL SERVER)   [20%]

Books:

1.   An Introduction to Database Systems, Vol.I & II – C.J. Date, Addison Wesley.

2.   Database system Concepts, 3rd edn. – Korth & Siberschatz, T.M.H

3.   Principles of Database Systems, 2nd edn. – J.D. Ullman, Galgotia

4.   Fundamental of Database System-Elmasri & Navathe, Pearson

BCA 206: Digital Electronics Lab

Study on the characteristic of AND, OR, NAND, NOR, EX-OR, EX-NOR gates

Design of different combinational circuit such as half adder/subtractor, full adder/subtractor, decoder/encoder, priority encoder, multiplexer, demultiplexer, magnitude comparator etc.

Study on the characteristic of different flip-flops-JK, RS, T, D etc.

Design and implementation of different sequential circuit such as shift register, counter-decimal, ripple.

BCA 207: Software Lab – III

Group A: Related to theory Paper BCA 202: Data Structure with C Language

Group B: Related to theory Paper BCA-205: Database Management System

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Semester - III

BCA 301: Operating System

Theory: 60 Lectures

Operating system as an extended machine and a resource manager, operating system concepts- process, files, shell, Operating system structure: monolithic system, layered systems, virtual machines, client server model. Idea of multiprogramming, multiprocessing, batch processing and time sharing. Real time systems
[30%]

Concurrent processes: Critical section problem, Semaphores & Synchronization. [10%]

CPU scheduling: Scheduling concepts and algorithms [15%]

Memory management: Static & dynamic partitioning, Dynamic relocation, Paging & demand paging memory management, Virtual memory, Replacement algorithm, Segmented memory management, Thrashing. [15%]

Device management: Scheduling concept and algorithm, spooling. [10%]

Deadlock detection, prevention and avoidance. [10%]

File management: File concept, access methods, allocation methods, Directory concept.[10%]

Books:

1.   Modern Operating Systems- A.S. Tanenbaum (PHI)

2.   UNIX – S.Das, TMH

BCA 302: Computer Organization and Architecture

Theory: 60 Lectures

Introduction: Evolution of Computers, Stored program concept and Von-Neumann architecture, Information representation and codes, Building blocks of Computers. [10%]

Register Transfer and micro operations: Concepts of bus, Data movement among registers, A language to represent conditional data transfer, Data movement from/to memory, Arithmetic and logical operations with register transfer, Timing in register transfer.   [25%]

CPU Architecture: Instruction format, Addressing mode, Instruction execution, Fetch and execution cycles, CPU organization with large registers, Stacks and handling of interrupts and subroutines, Instruction pipelining: stages, hazards and methods to remove hazards.   [25%]

Micro-programmed control unit: Basic organization of micro-programmed controller, Horizontal and vertical formats, Address sequencer.   [15%]

I/O Organization: Strobe based and handshake based communication, Vector and Priority interrupt, DMA based transfer.   [25%]

BCA 303: Object Oriented Programming using C++

Theory: 60 Lectures

Introduction: Principles of Object-Oriented-Programming (OOP), comparison of procedural programming and OOP, Advantages of OOP, Overview of OOP using C++   [10%]

Classes and Objects: Declaration of classes and objects, Objects as function arguments, Arrays of objects, returning objects from function, structures and classes.   [15%]

Constructors and Destructors: Constructors, Basic constructors, parameterized constructors, constructors with default argument, dynamic initialization of objects, copy constructors, dynamic constructors, destructors, constraints on constructors and destructors.   [10%]

Operator Overloading: Overloading unary operators, binary operators and arithmetic operators, multiple overloading, comparison operators, conversion between objects and basic types, conversion between objects of difference classes, constraints on type conversion.   [10%]

Derived Classes and Inheritance: Derived classes and base classes, defining a derived class, accessing base class member, Protected access specifier, derived class constructors, overriding the member function, class hierarchies, abstract base class, constructors and member function,

Inheritance- public and private, access combinations and usage of access specifiers, classes and structures, Multiple Inheritance   [15%]

Pointers: Pointers to objects, Virtual functions and Polymorphism.   [10%]

Streams: Stream classes , stream class hierarchy, stream manipulators, string streams, character stream classes , object I/O, file streams, Disk I/O with member function [15%]

Templates: Function templates and class templates   [5%]

Exception handling [5%]

Outline of Object oriented analysis and design.   [5%]

Books:

1. Object Oriented Programming through C++ E.Balagurusamy, TMH

BCA 304: Mathematics-III

Theory: 60 Lectures

Probability and Statistics: Permutation and Combinations, Probability, Classical definition of probability. Conditional probability. Statistical independence of events. Random variable and its expectation and variance, joint dispersion of attributes.   [15%]

Collection and presentation of data. Frequency distribution. Measures of central tendency. Measures of dispersion. Binomial, Poission and Normal distribution.   [15%]

Bivariate Frequency Distributions (scatter Diagram, Correlation coefficient and its properties, regression lines, correlation index and correlation ratio, rank correlation).   [15%]

Multiple linear regression, multiple correlation, partial correlation (for 3 variables only).   [7%] Random sampling, expectations and standard error of sampling mean. Expectation and standard error of sampling proportions.   [10%]

Test of significance based on t, F, and CHI square distribution.   [8%]

Numerical Methods and Algorithms

Solution of non-linear equations: Bisection, Newton-Raphson, Regular-Falsi and Secant method. Interpolation and approximation- Lagrange Interpolation, Newton's Forward Interpolation and Newton's backward Interpolation methods.

Integration: Trapizoidal and Simpson's 1/3 rules.

Solution of linear equations: Gaussian elimination, Gauss Sheidal method

Solution of different equations; Eular's, Taylor's series, Runge-kutta (order-2)   [30%]

Books:

1.   C Language and Numerical Methods C Xaviers, New Age International

2.   Fundamentals of Statistics – Goon, Gupta, DasGupta

BCA 305: UNIX and Shell Programming

Theory: 60 Lectures

Introduction, Brief history. Unix Components/Architecture. Features of Unix. The UNIX Environment and UNIX Structure. The login prompt. General features of Unix commands/ command structure. Command arguments and options. Understanding of some basic commands such as echo, printf, ls, who, date, passwd, cal, Combining commands. Meaning of Internal and external commands. The type command: knowing the type of a command and locating it. The man command knowing more about Unix commands and using Unix online manual pages. The man with keyword option and what is. The more command and using it with other commands. Knowing the user terminal, displaying its characteristics and setting characteristics. The root login. Becoming the super user: su command. The /etc/passwd and /etc/shadow files. Commands to add, modify and delete users.

Unix files. Naming files. Basic file types/categories. Organization of files. Hidden files. Standard directories. Parent child relationship. The home directory and the HOME variable. Reaching required files- the PATH variable, manipulating the PATH, Relative and absolute pathnames. Directory commands – pwd, cd, mkdir, rmdir commands. The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names. File related commands – cat, mv, rm, cp, wc and od commands. File attributes and permissions and knowing them. The ls command with options. Changing file permissions: the relative and absolute permissions changing methods. Recursively changing file permissions. Directory permissions.   [50%]

The vi editor. Basics. The .exrc file. Different ways of invoking and quitting vi. Different modes of vi. Input mode commands. Command mode commands. The ex mode commands. Illustrative examples Navigation commands. Repeat command. Pattern searching. The search and replace command. The set, map and abbr

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commands. Simple examples using these commands. The shells interpretive cycle. Wild cards and file name generation. Removing the special meanings of wild cards. Three standard files and redirection. Connecting commands: Pipe. Splitting the output: tee. Command substitution. Basic and Extended regular expressions. The grep, egrep. Typical examples involving different regular expressions.

Shell programming. Ordinary and environment variables. The .profile. Read and readonly commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and shift commands and handling positional parameters. The here (<<) document and trap command. Simple shell program examples. File inodes and the inode structure.   [50%]

Books:

1.   Sumitabha Das., Unix Concepts and Applications., 4th Edition., Tata McGraw Hill

2.   Behrouz A. Forouzan, Richard F. Gilberg : UNIX and Shell Programming- Cengage Learning – India Edition. 2009.

3.   M.G. Venkatesh Murthy: UNIX & Shell Programming, Pearson Education.

4.   Richard Blum , Christine Bresnahan : Linux Command Line and Shell Scripting Bible, 2ndEdition , Wiley,2014

BCA 306: Software Lab – IV(Programming in C++)

Practical

Program should be developed in C++ to implement the problems related to BCA-303

BCA 307: Software Lab – V(UNIX and Shell Programming)

Practical

Problems related to BCA-305.

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Syllabus of BCA (w.e.f 2020-2021)

Semester - IV

BCA 401: Software Engineering

Theory: 60 Lectures

Software Engineering Fundamentals: Definition of software product, Software Engineering Paradigms; Software engineering, Knowledge engineering, and End user development approaches.   [8%]

System Analysis: An abstraction, Partitioning and projection, Systems specification, Software Requirements Specification (SRS) standards, Formal Specification methods, Specification tools, Flow based, Data based and Object – Oriented Analysis.   [15%]

System Documentation: Principles of system documentation, types of documentation and their importance   [5%]

System Planning: Data and fact gathering techniques-Interviewing, communications, presentations and site visit. Feasibility study, feasibility reports, prototyping, cost-benefit analysis-tools and techniques.[8%]

Systems Design:Idealized and constrained design, Process oriented design (Game and Sarson and Yourdon notations), Data oriented design (Warnier–Orr, E-R modelling), Object oriented design (Booch approach), Cohesion and Coupling, Design matrices, Design documentation standard.   [25%]

Role of CASE Tools: Relevance of CASE Tools, High-end and Low-end CASE Tools.   [7%]

Coding and Programming : Choice of programming languages, Mixed language programming and cell semantics ,Re-engineering legacy systems, Coding standard.   [5%]

Software Quality and testing: Software quality assurance .Types of Software Testing (White Box and Black Box Testing, Unit Testing, Integration Testing, Verification and Validation of Software) , Debugging and Software Reliability analysis , Software quality and matrices, Software maturity model and extensions.
                                           [10%]

Software Cost and Time estimation: Functions points , Issues in software cost estimation : Introduction to the Rayleigh curve, Algorithmic cost models (COCOMO, Putnam- Slim, Watson, and Felix), Other approaches to software cost and Size estimation (software complexity, Delphi , costing by analogy).
                                           [10%]

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Software Project Management : Planning software , projects, Work breakdown structures, Integrating software design and project planning ,Software project teams, Projecting monitoring and control.   [7%]

Books

1. Software Engineering, A practioner's Approach- R. S. Pressman (Mc-Graw Hill Inc)

2. An Integrated Approach to Software Engineering-P.Jalote (Narosa Publication House)

BCA 402: Introduction to Microprocessor

Theory: 60 Lectures

Microprocessors: 8 bit microprocessor architecture; 8085 pin description [15%]

Programmers model of 8085, addressing modes of 8085; Instruction set of 8085; Assembly language program for 8085   [30%]

Memory interfacing; I/O interfacing; Peripheral ICs; I/O memory Interfacing Chips, Bus structure of microprocessor based systems, bus arbitration,; Interrupt handling and DMA operation. Basic idea about microprogramming. [30%]

Advanced Microprocessors: Functional description of 8086 microprocessor, software model of 8086/8088; Data addressing modes of 8086; 80x86 family of microprocessor   [15%]

Comparison of different microprocessors; microprocessors of other families; Assembly language program of 8086 microprocessor.   [10]

Books:

1. Microprocessors: A.P.Mathur

2. Microcomputer systems -8086/8088 family: Liu and Gibson

3. Programming the 80286,80386 Computers: B.B. Brey

4. Microprocessors and Interfacing: Hall

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BCA 403: Internet and E-commerce

Theory: 60 Lectures

Introduction to Internet: Evolution of Internet, concept of Intranet and Internet, Applications of Internet, Types of Connectivity such as dial – up, leased, VSAT. etc., Internet Server and Clients module in various Operating Systems, TCP/IP, Introduction to RFC, Addressing in Internet – IP and Domains, major features of IP, IP datagram, major IP services, IP source routing, value of the transport layer, TCP, major features of TCP, passive and active operation, Internet Service Providers.[15%]

E-mail and List-servers: E-mail Networks, E-mail protocols(X.400, SMTP, UUCP), Format of an E- mail message , Description of E-mail Headers, E- mail contents and encoding, E-mail routing, List servers, E-mail clients, POP-3, IMAP-4.   [10%] File Transfer Protocol : Introduction to FTP, public domain Software, Types of FTP Servers, FTP clients, Common Commands.   [8%]

Telnet: Telnet protocol, Server daemon, Telnet clients, Terminal emulation[7%] Usenet and Internet Relay Chart Introduction to World Wide Web: Evolution of WWW, Basics Features, WWW Browsers, WWW servers, HTTP & URL's   [7%] WWW Browsers: Basic   features,   Bookmarks, history.   Progress indicators, Personalization of Browsers, Printing displayed pages and forms, Saving Web pages, Netscape Communicators, Internet Explorer, Search and Downloads.   [8%]

Web Publishing: Technology Overview , Web site planning, Where to host your Web site, Multiple sites on one server, Maintaining a Web site, Publishing tools.   [10%]

HTML: Document overview, Header elements, Section Headings, Block- oriented elements, Lists, Inline elements, Visual Mark-up, Hypertext links, Uniform Resource Locators,(URL's), Images, Forms, Tables, Special characters   [10%]

Interactivity Tools: CGI, ActiveX, VB Script, Java Script and java   [3%]

Multimedia and Graphics: VRML   [2%]

Search Engines: Technology overview, Popular   Search   Engines,   How to register a Web site on

search engines.   [5%]

Internet Security: Overview of Internet Security threats, Firewalls, Introduction to AAA. [5%]

E-commerce: Introduction to E-commerce, Payment Methodology, Security aspects, Standard in electronic payment. E-commerce and Banking, E-commerce and Retailing. [10%]

Books:

1. Internetworking with TCP/IP – by D.E.Comer, PHI

2. E-Commerce-Paul A.Murphy, TMH

BCA 404: Java Programming

Theory: 60 Lectures

Introduction: JAVA as internet language. A first simple program. Entering the program, Compiling the program, control statements, using blocks of code, lexical issues-white space, identifiers, literals, comments, separators, The Java keyword-The java class libraries, data types, variables and arrays, the simple types, integers-byte, short, int, long, floating point types-float, double, characters, Booleans. A closer look at literals-integer literals, floating point literals, Boolean literals, character literals, string literals, variables – declaring a variable, dynamic initialization, the scope and lifetime of variables, type conversion and casting – java's automatics conversions, casting incompatible types, automatic type promotion in expressions, the type promotion rules, arrays-one dimensional arrays, multidimensional arrays, alternative array declaration syntax. Operators-assignment operators, increment and decrement, the bitwise operators, relational operators, Boolean logical operators, the assignment operator, the ? operator, operator precedence, using parentheses, control statements-Java's selection statements, if, switch, interaction statements-while, do-while, for, some for loop variations, nested loops, jump statements-using break, using continue, return.
[20%]

Introduction Classes: class fundamentals, the general form of a class, a simple class, declaring objects, a closer look at new, assigning object reference variables, introducing methods, adding a method, the box class, returning a value, adding a method to the box class, constructors, parameterized constructors, the this keyword, instance variable hiding, garbage collection, the finalize method, a stack class, a closer look at methods and classes, overloading methods, overloading constructors. Using object as parameters, argument passing, returning objects, introducing access control, understanding static, introducing final, arrays revised., exploring the string class, using command line arguments, inheritance, inheritance basics, a more practical example, a superclass variable can reference a subclass object, using super, using super to call superclass constructors, a second use for super, creating a multilevel hierarchy, when constructor are called, method overriding, dynamic method dispatch, overridden methods, applying methods overriding, using

abstract classes, using final with inheritance, using final to prevent overriding, using final to prevent inheritance, the object class.

[20%]

Package and interfaces: Defining a package, understanding class path, a short package example, access protection, an access example, importing packages- interface-defining an interface, implementing interfaces, applying interfaces, variables in interfaces, interface can be extended   .[7]

Exception Handling: Exception fundamentals, exception types, uncaught exceptions, using try and catch, displaying a description of an exception, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions-creating you own exception subclasses, using exceptions, multithreaded programming.   [8%]

Threads: The java's thread model, thread priorities, synchronization, message, the thread class and the runnable interface, the main thread, creating a thread, implementing runnable, extending thread, closing an approach, creating multiple thread, thread priorities, synchronization, using synchronized methods, the synchronized statement, interthread communication, using multithreading.   [10%]

Applets: Concept, and use of applet, I/O basics, streams, applet fundamentals, writing simple applet program.   [5%]

Stream classes: The predefined streams, reading console input, writing console output, reading and writing files, the transient and volatile modifiers, using instance of native methods, problem with native methods.   [5%]

String handling: The string constructor, string length, special string operations-string literals, string concatenation, string concatenation with other data types, string conversion, character extraction, string comparison, searching strings, modifying a string-data conversion using string buffer constructors.   [10%]

Wrappers: Number, double and float, integer and long, character, Boolean, process, runtime, memory management, executing other programs, system-using current time limits to time, program execution, using array copy, environment properties, object, using clone and the cloneable interface, class, class loader, math-transcendental functions, exponential functions, rounding functions, miscellaneous math methods, classes, input stream, output stream file input stream, file output stream.   [10%]

Java Database Connectivity (JDBC): Implementation of simple system using JDBC.   [5%]

Books:

1.   Programming with JAVA – E.Balagurusamy, TMH

BCA 405: Computer Graphics

Theory: 60 Lectures

Display devices: Raster, vector devices; colour display techniques; colour look up tables.

2-D graphics: Line and curve generation algorithm; polygon filling; 2-D transformations; windowing and clipping.   [60%]

Interactive graphics: Interactive input devices; Interaction handling.

3-D graphics: 3-D surface modelling; 3-D transformations; Hidden line and surface elimination; Rendering of 3-D objects.   [30%]

Graphics Languages: GKS, PHIGS [10%]

Books:

1. Foley, Vandam, Feiner, Huges, ―Computer Graphics: Principles & Practice‖, Pearson Education, second edition 2003.

2.   Procedural Elements of Computer Graphics – D.F.Rogers McGraw Hill

3.   Principles of Interactive Graphics – Newman & Sproull McGraw Hill

BCA 406: Software Lab – VI(Java Programming)

Practical

Program should be developed to implement the problems related to BCA-404

BCA 407: Software Lab – VII

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Practical

Group A: Related to theory Paper BCA 402: Microprocessor

Group B: Related to theory Paper BCA-405: Computer Graphics

Semester - V

BCA 501: System Software

Theory: 60 Lectures

Introduction to software processor: system software and Machine architecture- Architecture of

Intel 8086 – Data and instruction formats – addressing modes – instruction sets – I/O and programming.
[10%]

Language processor: Introduction, Language processing activities, Fundamentals of language processing, Fundamentals of language specification, language processor development tools. [15%] Assemblers: Introduction to assembler, assembler directives, Forward reference, Types of assemblers, Data structures of assembler, assembler design one pass assembler, two pass assembler.

[15%]

Macros and Macro processor: Macro definition and call, Macro expansion, Nested macro calls, Advanced macro facility, Design of macro processor. [15%]

Loaders: Basic functions of loader, Machine dependent loader feature, Machine dependent loader features, Loader design options. [15%]

Linker: Introduction, Relocation and Linking concepts, Design a linker, Self relocating program linking for overlays. [10%]

Interpreter: Overview of compiler, difference between compiler and interpreter, scanning, symbol table, parsing expression and assignment, control statements, Simple interpreter design. [10%]

Text Editor: Text Editor: An Introduction, Overview of the Editing Process, Types of Editors, User interface, Editor Structure, Interactive Debugging System, Debugging Functions and Capabilities, Relationship with Other Parts of the System, User interface Criteria.   [10%]

BCA 502: PHP Programming

Theory: 60 Lectures

Introduction to HTML:

HTML – URI, LIST, Hyperlinks: History of HTML, Introduction to URI: Fragment Identifier & Relative Uniform Resource indicator, Standard Generalized Markup Language, Structure of HTML document, Switching between your Editor and Browser, Structuring Web Page, Paragraph and Line Break Tags, Adding Comments, Formatting your Text; Creating Lists: Ordered List Tags, Unordered List Tag & Nesting Lists: Controlling How Ordered Lists are displayed, Creating a Multilevel Outline, Using Start and Value Attributes in an Ordered List, Controlling the Display of Unordered List, Creating Definition List; Creating Hyper Text Links,   Linking to a File or Data Object, Linking to NON-WWW Files, Linking to a Place in the Same HTML File, Linking to a Place in Another HTML File, Creating Link Lists, Creating a Simple Link List;   [30%]

Introduction to PHP:

Open source-PHP – history- features-variables- statements operators-conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue.

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions- cookies- executing external programs- Creating sample applications using PHP.

Database Management System: Components of Database system-Definition and benefits of database- Data Independence-Three level of database architecture-Database Management systemClient server architecture-Distributed processing-Domains-Relations-Integrity constraints-Candidate keys-Primary keys-Foreign keys-Functional dependency(Basic definition)-Normal Forms (INF, 2NF, 3NF, BCNF)-ER model – OOAD model.

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MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connectionDatabases and tables- MySQL data types-Creating and manipulating tablesInsertion, updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filtering-Data manipulation functionsAggregate functions -Grouping data- Sub queries- Joining Tables- Set operatorsFull text searching.

PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MYSQL commands in PHP, processing result sets of queries- handling errors-debugging and diagnostic functions- validating user input through Database layer and Application layer- formatting query output with Character, Numeric, Date and time –sample database applications.   [70%]

Books:

1.   VIKRAM VASWANI, —PHP and MySQL‖, Tata McGraw-Hill

2.   BEN FORTA , ‖MySQL Crash course ― SAMS

3.   C.J. DATE, —An Introduction to Database Systems‖, Addison Wesley, Sixth Edition. 4.Ramesh Elmasri and Shamkant B Navathe,‖ Fundamentals of DataBase Systems‖,Pearson Education.

BCA 503: Python Programming

Theory: 60 Lectures

Planning the Computer Program: Concept of problem solving, Problem definition,   Program   design, Debugging, Types of errors in programming, Documentation.   [5%]

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.   [5%]

Overview of Programming : Structure of a Python Program, Elements of Python [5%]

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).   [15%]

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Creating Python Programs: Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions. [15%]

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries. Data Structures: Arrays, list, set, stacks and queues. [20%]

Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion sorting. [5%]

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists.[15%]

Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries. [5%]

Data Structures: Arrays, list, set, stacks and queues.   [5%]

Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion sorting. [5%]

References :

   i.   T. Budd, Exploring Python, TMH, 1st Ed, 2011
   ii. How to think like a computer scientist : learning with Python / Allen Downey, Jeffrey Elkner, Chris Meyers. 1st Edition – Freely available online.2012
   iii. //http://docs.python.org/3/tutorial/index.html
   iv. //http://interactivepython.org/courselib/static/pythonds

BCA 504: Principles of Management

Theory: 60 Lectures

Meaning and Role of Management Information System- Introduction, Definition, System? Approach. Development of Organizational Theory, Management & Organizational Behaviour, Management, Information & System Approach.   [25%]

Data Processing- Operation of Manual Information System, Components of Computer System, Conversion of Manual to Computer Based Systems, Data Bank Concept, Types of Computer Based Applications. Information System for Decision Making- Evolution of Information System, Decision Making & Management Information System. [25%]

Strategic & Project Planning for Management Information System- Business Planning, Management Information System Responses, Management Information System Planning- General & Details Conceptual System Design- Define Problem, Set System Objective, Establish System Constraints, Determine Information Needs & Sources, Develop Alternative Conceptual Design & Documentation, Prepare the Design Report.   [25%]

Detailed System Design- Aim, Project Management, Define Subsystem, Input, Output & Process Design, System Testing, Software & Hardware selection, Documentation of Detailed Design. Pitfalls in Management Information Systems. [25%]

Text & Reference Books:

1.   Robert G. Murdick, Joel E. Ross, James R. Claggett, Information System for Modern Management.

2.   Surendra Basandra, Computers Today

BCA 505: Intelligent System

Theory: 60 Lectures

Scope of Artificial Intelligence, games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques in search and knowledge abstraction [20%]

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Problem solving; state space search, search space control, heuristic search, hill climbing, branch and bound.
[20%]

Knowledge representation; predicate logic, rule-based system, structured knowledge representation, semantic net. [20%]

Handling uncertainty, Fuzzy sets, probabilistic reasoning . [15%]

Learning, learning automation, learning by induction, Neural Networks, Genetic Algorithms Emerging technologies and devices . [25%]

Books:

1.Artificial Intelligence, Rich & Knight, TMH 2.Introduction to AI & Expert Systems,Patterson,PHI

3.Neural Networks, Fuzzy Logic & Genetic Algorithms,Rajsekharan,PHI 4.Expert Systems, Giaranto, VIKAS

BCA 506: Software Lab VIII (PHP Programming)

Practical

Program should be developed to implement the problems related to BCA-502

BCA 507: Software Lab IX (Python Programming)

Practical

Program should be developed to implement the problems related to BCA-503

Semester - VI

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BCA 601: Elective 1

Theory: 60 Lectures (i) Theory of Computation

Concept of Automation: Definition, concept of sequential circuits, state table & state diagram, concept of synchronous, asynchronous machines.   [10%]

Finite State Machines: Basic definition, mathematical representation, Moore versus Mealy m/c, capability & limitations of FSM, state equivalence & minimization, machine equivalence, incompletely specified machines, merger graph & compatibility graph, information loss less & inverse machines: testing table & testing graph.   [30%]

Finite Automation: Preliminaries (strings, alphabets & languages, graphs & trees, set & relations), definition, recognition of a language by an automata - idea of grammar, Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA), Regular Expressions, Equivalence of DFAs, NFAs, and Regular, Expressions, Non-regular languages, Pumping lemma [30%]

Introduction, definition, derivation trees, simplification, Context-Free Grammar (CFG), Parse Trees, [10%]

Pushdown Automata: Definition, moves, Instantaneous Descriptions, Deterministic & Non- Deterministic Push Down Automata (PDA), Acceptance by final state & Empty stack, Equivalence of CFGs and PDAs.
[20%]

Books:

a) Hopcroft JE. and Ullman JD., ―Introduction to Automata Theory, Languages & Computation‖, Narosa.
b) Lewis H. R. and Papadimitrou C. H., ―Elements of the theory of Computation‖, P.H.I.
c) Kain, ―Theory of Automata & Formal Language‖, McGraw Hill.
d) Kohavi ZVI, ―Switching & Finite Automata‖, 2nd Edn., Tata McGraw Hill.

OR

(ii)Image Processing

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Image digital representation. Elements of visual perception. Sampling and quantisation. Image processing system elements. Fourier transforms. [25%]

Extension to 2-D, DCT, Walsh, Hadamard transforms. Enhancement and segmentation. Point and region dependent techniques. Image encoding: Fidelity criteria. Transform compression. KL, Fourier, DCT, Spatial compression, Run length coding. Huffman and contour coding. [50%]

Restoration: Models: Constrained & Unconstrained, Inverse filtering, Least squares filtering, Recursive filtering. [25%]

Books:

a) Digital Image Processing & Analysis, Chanda, PHI 2.Fundamentals of Digital Image Processing,Jain,PHI
b) Image Processing , Analysis & Machine Vision , Sonka, VIKAS

BCA 602: Elective 2

Theory: 60 Lectures

(i)   Web Programming and .NET Technology

Introduction to Internet: : A Network of Networks, Gateway; History of the Internet: Connecting to the Internet, Internet Service Providers, DNS Servers, Connection Types, Modems, Connecting to the Internet using Dialup Networking; Web Browsers; Web Browser;; Routers; Origins and Development of the Internet; Moving Data across the Internet: Internet Addresses. [10%]

The World Wide Web: Introduction to world wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Applications, Websites – Home Pages: Web Site Development , Web Content Authoring, Web Graphics Design, Web Programming, Web server Administration, Protocols, Search Engines & Search Engines, Plug-ins, FTP Applications.   [15%]

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HTML – URI, LIST, Hyperlinks: History of HTML, Introduction to URI: Fragment Identifier & Relative Uniform Resource indicator, Standard Generalized Markup Language, Structure of HTML document, Switching between your Editor and Browser, Structuring Web Page, Paragraph and Line Break Tags, Adding Comments, Formatting your Text; Creating Lists: Ordered List Tags, Unordered List Tag & Nesting Lists: Controlling How Ordered Lists are displayed, Creating a Multilevel Outline, Using Start and Value Attributes in an Ordered List, Controlling the Display of Unordered List, Creating Definition List; Creating Hyper Text Links,   Linking to a File or Data Object, Linking to NON-WWW Files, Linking to a Place in the Same HTML File, Linking to a Place in Another HTML File, Creating Link Lists, Creating a Simple Link List.   [20%]

Introduction to .NET Framework, Introducing VB.NET: New Object Oriented Capabilities-Inheritance-Parameterized Constructors- Overriding- Overloading- Shared Members- Events- Exception Handling-.NET Framework Class Hierarchy-The System Namespace. File I/O: Using the System.IO Hierarchy- Streaming text in and out of Text Files- Object Serialization and Deserialization.   [20%]

Introduction to ADO.NET: Comparison between ADO & ADO.NET—The difference between Connection Model & Disconnected Model – difference between the DataSet and RecordSet- The Dataset Model. Accessing Data using ADO.NET: dataset-DataAdapterDataRelation. The two Managed Providers: SQL Managed Provider-OLEDB Managed Provider. The ADO.NET Object Model: OleDbConnection   /SQLConnectionOleDbCommand/SQLCommand-OleDbDataReader/SQLDataReaderOleDbDataAdapter/SQLDataAdapter-The DataSet. Using the Binding Manager to bind controls to the data - Working with Master-Detail relationship. [15%]

Differences between ASP and ASP.NET. ASP.NET Web Forms: The code behind Web Form- Separations of content & Business logic-Life Cycle of a Web Form Page-Stages in Web Form Processing . [10%]

ASP.NET Server Controls. Web Forms Server Controls Recommendation: Validation Controls- Controls that incorporate logic to validate user inputs like a required field, between ranges, or pattern matching. ASP.NET Data Access: Data Binding Server Controls-Viewing Data Collections in a Grid. ASP.NET Caching Mechanism for caching Dynamic response data. Page Output Caching. [10%]

OR

(ii)   Advance Networking & Communication

Introduction to computer network- Topology; Base Band & Broad Band Topology; Guided & Unguided Media. Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM); Multiplexing (TDM, FDM, STDM). Encoding (RZ, NRZ, BIPLOAR, MANCHESTER, DIFF. MANCHESTER).   [20%]

Digital To Analog – ASK, PSK, FSK, QPSK. Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control, Error Detection methods. Goals of Layered protocols- Introduction to OSI, TCP/IP, IBM, SNA, ATM. Bit oriented (BSC) & Character oriented Protocol (SDLC, LAPB, LAPD, LLC)

[20%]

HDLC- frame format, station, states, configuration, access control. LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5) Introduction to WAN – DQDB (IEEE802.6) & FDDI. Switching Technologies – Circuit, Message, and Packet. X.25, RS-232 C – frame format, channel, packet frames, facilities (In brief Only). ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.   [30%]

Introduction to leased lines, DSL, Digital Carriers. Bridging & Routing – Static & Dynamic (In Brief). IP, IP addressing, ICMP, ARP.RARP. Congestion Control, TCP, UDP. HTTP,FTP,Telnet,SMTP. Introduction to data security (private key, public key, ISO standards). Introduction to Mobile technology (Topology, FDM, TDM, CDMA), Satellite Communication (LEO, GEO, TDM).   [30%]

Books:

a) .Data Communication & Networking, Forouzan, TMH 2.Computer networks,Tannenbaum,PHI
b) Computer Communication Networks,Shanmugam & Rajeev, ISTE/EXCEL 4.Data & Computer Communication,Stallings,PHI
c) Data & Network Communication, Miller, VIKAS
d) Data Communication & Network, Dr. Prasad, Wiley Dreamtech 7.Computer Network Theory, Prasad, Scitech M

BCA 603: Major Project & Viva

It is desirable that project work should be done in an Industry/Organization.

Group length should ideally be of 4 students (max).

Emphasis should be given on real life problems.