



B. C. A. (Hons)

Scheme and Syllabus
Department of Computer Science
AKS University
July 2020

BCA (Hons) Syllabus

Semester 1.

S.NO.	PAPER CODE	SUBJECT NAME	#L	#T	#P	# CREDITS
1	96CA101	Programming Fundamentals using C	4	0	0	4
2	96CA102	Computer System Architecture	4	0	0	4
3	96EV103	Environmental Science	2	1	0	3
4	96CA104	Computer Fundamentals	4	0	0	4
5	96MS105	Mathematics-I(Algebra)	4	1	0	5
1	96CA151	Programming Fundamentals using C (LAB)	0	0	4	2
2	96CA152	Computer System Architecture (LAB)	0	0	4	2
3	96CA153	Computer Fundamentals (LAB)	0	0	4	2
		TOTAL CREDITS	18	02	12	26

Programming Fundamentals using C

Unit-1

Introduction to C: History of C, Overview of Procedural Programming, main() function, Compiling and Executing Simple Programs in C.

Data Types, Variables, Constants, Operators and Basic I/O: Declaring, Defining and Initializing Variables, Scope of Variables, Constants, Keywords, Data Types, Operators (Arithmetic, Logical and Bitwise), Comments, Character I/O (getc, getchar, putc, putchar etc), Formatted and Console I/O printf(), scanf(), Basic Header Files (stdio.h, conio.h etc).

Unit-2

Expressions, Conditional Statements and Iterative Statements: Operators. Unary Operator, Binary Operator, Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Nested Statements.

Functions: Utility of Functions, Functions Parameters, Declaration and Definition of Functions, Return data type of functions, Call by Value, Call by Reference, Recursion.

Unit-3

Array: One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Introduction to Multi-dimensional Arrays, Strings, Command Line Arguments.

Unit-4

Pointers and References: Pointer Variable, Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, Passing arrays to functions, Dynamic Memory Allocation.

Derived Data Types (Structures and Unions): Structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures

Unit-5

File I/O, Preprocessor Directives: Opening and Closing a file (fstream header file), ifstream, ofstream and fstream classes, Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files,

Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

Text Books:

1. The Complete Reference 'C', Tata Mc Graw Hill Fourth Edition Herbert Schild

Reference Books:

1. Programming Language in 'C' Gotfried, Tata MC Graw Hill.
2. Let Us C, Yashwant Kanitkar

Programming Fundamentals using C Lab

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. Write a program to find the greatest number among the three.
4. WAP to compute the sum of the first n terms of the following series $S = 1 - 2 + 3 - 4 + 5 \dots$
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 number is prime or not. Use the same to generate the prime numbers less than 100.
7. Write a macro that swaps two numbers.
8. WAP to print a triangle of stars as follows (take number of lines from user):

```
      *
     ***
    *****
   ********
  **********
```

9. 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
10. Write a program that swaps two numbers using call by value method.
11. Write a program that swaps two numbers using pointers.
12. 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.
13. Write a menu driven program to perform following operations on strings:
 - i. Show address of each character in string
 - ii. Concatenate two strings without using strcat function.
 - iii. Concatenate two strings using strcat function.
 - iv. Compare two strings
 - v. Calculate length of the string (use pointers)
14. WAP to display Fibonacci series (i) using recursion, (ii) using iteration

Computer System Architecture

Unit 1

Data Representation and Basic Computer Arithmetic: Number Systems, Complements, Fixed and Floating-Point Representation, Character Representation, Addition, Subtraction, Magnitude Comparison, Multiplication and Division Algorithms for Integers

Unit 2

Gates and Circuits: Logic gates, Boolean algebra, K-Map, Circuit Simplification, Sequential Circuits, Flip-Flops and Combinational Circuits Decoders, Multiplexers, Registers, Counters and Memory Units.

Unit 3

Basic Computer Organization and Design: Computer Registers, Bus System, Instruction Set, Timing and Control, Instruction Cycle, Memory Reference, Input-Output and Interrupt, Interconnection Structures, Bus Interconnection Design of Basic Computer.

Unit 4

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

Unit 5

Memory Organization: Memory hierarchy, Cache memory, Associative memory, mapping.

Input-Output Organization: Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Recommended Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992
2. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition 2009, Prentice Hall of India
3. Digital Design, M.M. Mano, Pearson Education Asia

List of Practical

1. Study of AND, OR NOT Gates.
2. Study of NAND, NOR, XNOR Gates
3. To verify the truth table of XOR and XNOR Gates
4. To Verify operation of AND and NOR gates as Universal Gates.
5. To study Half Adder Circuit.
6. Configuring Hardware Profile.
7. Installation of Network Interface Card (NIC).
8. Draw layout & understand sections of Motherboards & Add on Cards.
9. Configuring important parameters of CMOS Setup utility, BIOS update.
10. Identify different types of Drives (FDD, HDD, CDO, Zip, Pen, SCSI Drive).
11. Installation of SCSI Drive, Optical Drives (CDR, DVRW).
12. Installation of OS Single, Partitioning, Formatting.

Environmental Science

Unit I

Definition, scope and importance, need for public awareness. Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, mining, dams and their effects on forest. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Land resources: Land as a resource, land degradation, soil erosion and desertification.

Unit II

Food resources: World food problems, effects of modern agriculture, fertilizer-pesticide problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit III

Concept of an ecosystem, Structure and function of an ecosystem, Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. introduction, types, characteristic features, structure and function of the terrestrial ecosystem and Aquatic ecosystems.

Diversity, Definition & types, Bio-geographical classification of India, Value of biodiversity, Biodiversity at global, National and local levels. India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity.

Unit IV

Definition: Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.

Unit V

Sustainable development, urban problems related to energy Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environmental legislation, Public awareness. Population growth, Population explosion - Family Welfare Programme, Environment and human health. HIV/AIDS. Role of Information Technology in Environment and human health.

Suggested Books:

1. A text book of Environmental Studies, Erach Bharucha, UGC Publication Delhi
2. A text book of Environmental science: Purohit Shami & Agrawal, Agrobios Student edition Jaipur
3. A text book of Environmental Studies: Kaushi & Kaushik New age International Publication
4. Paryavaran Addhyan : MP Hindi Granth Academy
5. Paryavaran Addhyan : KL Tiwari and Jadhav
6. Paryavaran Addhyan/Shiksha by: Dr Mahendra Kumar Tiwari University Publication Delhi
7. Introduction to Environmental Science by Y. Anjaneyulu BS Publication Hyderabad

Computer Fundamentals

Unit 1

Introduction: Introduction to Computer System, Uses, Types, Generation, Algorithm, Flow-Chart, DOS, DOS Commands

Human Computer Interface: Types of software, Operating system as User-Interface, Utility Programs

Unit 2

Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks

Unit 3

Internal Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

Unit 4

Networking and communication Technologies: LAN, MAN, WAN, Internet, WWW, Bluetooth, Cloud Computing, Cloud Application, Big Data, Data-Mining, Mobile Computing and Embedded Systems. E-Mails, Search Engines, Social Networking. Audio-video Conferencing. Voice over Internet Protocol (VOIP).

Unit 5

Office Automation: MS Word, MS Power-point, MS Excel, MS Access, Introduction to ERP.

Reference Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

Computer Fundamentals Lab

Practical exercises based on MS Office/ Open Office tools using document preparation and spreadsheet handling packages.

MS Word

1. Prepare a **grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
 - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.
2. Create a **telephone directory**.
 - The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier New Font.
 - The footer should show the page number as well as the date last updated.
3. Design a **time-table form** for your department.
 - The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - The second line should give the course name/teacher's name and the department in 14-point Arial.
 - Leave a gap of 12-points.
 - The rest of the document should use 10-point Times New Roman font.
 - The footer should contain your specifications as the designer and date of creation.
4. BPB Publications plans to release a new book designed as per your syllabus. Design the **firstpage of the book** as per the given specifications.
 - The title of the book should appear in bold using 20-point Arial font.
 - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one-page documents.
 - a. Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
 - b. Design a certificate in landscape orientation with a border around the document.
 - c. Design a Garage Sale sign.
 - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:
 - (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 - (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter
Type the following as shown (do not bold).

Color, Style, Item
Blue, A980, Van
Red, X023, Car
Green, YL724, Truck
Name, Age, Sex
Bob, 23, M
Linda, 46, F
Tom, 29, M

8. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	27	1423	1193
White, Pete	21	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

9. Wrapping of text around the image.
10. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except online collaboration, Tools on Macro, Templates

MS Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate	Amount
Delhi	2020	2400	2100	3000		15	
Punjab	1100	1300	1500	1400		20	
U.P.	3000	3200	2600	2800		17	
Harayana	1800	2000	2200	2700		15	
Rajasthan	2100	2000	1800	2200		20	

TOTAL

AVERAGE

(a) Apply Formatting as follow:

i. Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	HarBhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
≥ 80	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	Salesman		Sales in (Rs.)				
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		

5	S003	4000	9000	6500	8200
6	S004	5500	6900	4500	10500
7	S005	7400	8500	9200	8300
8	S006	5300	7600	9800	6100

Calculate the commission earned by the salesmen on the basis of following Candidates:

If total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

- HRA Dependent on Basic
 - 30% of Basic if Basic \leq 1000
 - 25% of Basic if Basic $>$ 1000 & Basic \leq 3000
 - 20% of Basic if Basic $>$ 3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is \leq 1000Rs. 75/- if Basic $>$ 1000 & Basic \leq 2000
Rs. 100 if Basic $>$ 2000
- Entertainment Allowance NIL if Basic is \leq 1000Rs. 100/- if Basic $>$ 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is \leq 1500
Rs. 60/- if Basic $>$ 1500 & Basic \leq 3000
Rs. 80/- if Basic $>$ 3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
--------------------	----	----	----	----	----

3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- (a) Calculate total sale year wise.
 (b) Calculate the net sale made by each salesman
 (c) Calculate the maximum sale made by the salesman
 (d) Calculate the commission for each salesman under the condition.
 (i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 (ii) Otherwise give 2% commission.
 (e) Draw a bar graph representing the sale made by each salesman.
 (f) Draw a pie graph representing the sale made by salesman in 2000.
8. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL					
Publisher Name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs. 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00	

- (a) Compute the total revenue earned.
 (b) Plot the line chart to compare the revenue of all publisher for 4 years.
 (b) Chart Title should be _Total Revenue of SAM's Bookstall (1997-2000)'
 (c) Give appropriate categories and value axis title.
9. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60.

Mathematics-I (Algebra)

Unit-1

Determinants:

Introduction of Determinant, Minor Cofactors and properties of Determinant, Factor Theorem, special types of Determinants, Application of Determinants, Solution of Simultaneous Linear Equation by Determinants (Cramer's Rule).

Unit-2

Algebra of Matrices:

Definition, various types of matrices, Addition, Subtraction, Multiplication of matrices, Properties of matrix multiplication, Adjoint of Square matrix, Inverse of matrix, Rank of matrix, Normal form (Canonical form).

Unit-3

Consistency of linear system of equation and their solutions:

Solution of Simultaneous Equation, Types of Linear Equation, Homogeneous Equations, Cramer's Rule, Linear Dependence and Independence of Vectors, Eigen values, Eigen Vector, Cayley-Hamilton Theorem, and Orthogonal Vectors.

Unit-4

Complex Number:

Introduction of Complex Numbers, Geometrical Representation of Imaginary Numbers, Argand Diagram, Equal Complex Number, Addition, Subtraction, Power of i , Multiplication, Conjugate of a complex Number, Division, Types of Complex Number, Square Roots of a Complex Number.

Unit-5

Vector Algebra:

Vectors, Additions of Vectors, Unit Vector, Position Vector of a Point, Ratio Formula, Product of two Vectors, Scalar, or Dot Product, Vector Product or Cross product, Scalar Triple Product, Vector product of three Vector, Area of Parallelogram.

Text Books

1. **H.K. Dass**, Higher Engineering Mathematics, S. Chand Publishing & Company India Ltd. New Delhi (2012).

References Book:

1. DeFranza, Gagliardi. Introduction to Linear Algebra with Applications, New Age International (P) Ltd. New Delhi (2012).
2. A.K. Sharma, Linear Algebra, Discovery Publishing House, 2007

Semester 2

S.NO.	PAPER CODE	SUBJECT NAME	#L	#T	#P	# CREDITS
1	95CA201	Programming in C++	4	0	0	4
2	95CA202	Discrete Structures	4	1	0	5
3	95SD203	English Communication	2	0	0	2
4	95CA204	Multimedia Tools and Applications	4	0	0	4
5	95CA205	Information Security and Cyber Laws	4	1	0	5
1	95CA251	Programming in C++ (LAB)	0	0	4	2
2	95CA252	Multimedia Tools and Applications (LAB)	0	0	4	2
		TOTAL CREDITS	20	02	08	24

PROGRAMMING IN C++

Unit – 1

OOPS - Evolution of programming methodologies, origin of C++, procedural Approach Vs. Object oriented approach, Principles or concepts of OOPs. Merits and demerits of OOPs. Comparison of C and C++-Limitations of C, Introduction to C++, Structure of C++ Program. Added features of C++ over C-Storage classes, reference variables, inline functions, cin, cout. Scope resolution operator, member de-referencing operator. Default arguments.

Unit – 2

Introduction to Objects and Classes-Defining the class, defining data members and member functions, creating objects, access specifiers- private, public, protected. Nested classes, local classes, empty class. Friend function and friend class. Passing objects as function arguments, returning objects from functions, static members, this pointer, comparison of class with structure. Memory management-new and delete operator, pointer to object, pointer to class members, wild pointers, dangling pointers, smart pointers.

Unit – 3

Constructors and Destructors - Purpose of constructors and destructors, default constructors, constructors with and without parameters, Constructor overloading, copy constructor, deep and shallow copy. Invoking constructor and destructor, dynamic constructors, constructors and destructors with static members.

Overloading Concepts - Function Overloading, Unary and binary operator overloading, overloading new and delete operators, overloading special operators.

Unit – 4

Inheritance-Basic concepts, Reusability and Extensibility, Types of Inheritance, private, public and protected Inheritance. Virtual base class. Virtual destructor. Overriding member functions, order of execution of constructors and destructors. Polymorphism-Method polymorphism, polymorphism by parameter, parametric polymorphism, early and late binding.

Exceptions - Exceptions, Inheritance and Exceptions, Exception-Hierarchies, Inside an Exception Handler, defining your own exceptions

Unit – 5

Templates - Generic functions, Generic classes, Template restrictions. Streams and manipulators. Unformatted I/O functions. Files-Opening, reading, writing, appending and closing files.

Text books:

1. Object Oriented Programming using C++, E. Balagurusamy

Reference books:

1. Object Oriented Programming in C++, Robert Lafore
2. UML in 21 Days, Tech Media

List of Practical

1. Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius using a class called temp and member functions.
2. Create a class Distance, which accepts data in feet and inches, adds two distances and displays the members of the distance object in the appropriate form. Test the class in the main program by creating object d1 and d2 of type distance, accept data for each object and add them then display them.
3. Define a class to represent Bank account. Write a main program to test the class for handling 10 customers, include the following members.

Data members	Member Functions
(1) Name of depositor	(a) To assign initial values
(2) Account number	(b) To deposit an amount in a particular account
(3) Type of account	(c) To withdraw amount after checking the balance
(4) Balance member functions	(d) To display name and balance

4. Write a program that calculates the value of m raised to the power n for both int and double data types. (Use the concept of function overloading)
5. Write a function, which will take two objects of Distance Class as arguments and returns the largest one. Include a main () program to implement this function of the distance class.
6. Demonstrate the use of static variables and static function in a class by using it to count the number of objects created in the program, having a static function to display the count.
7. Create a class date which stores date in dd-mm-yyyy format. Include appropriate constructors to initialize the objects. Write a member function which gives the differences of given two dates as number of days. Another function to which days can be added so as to given the date after addition of days. Check the class by creating objects of the date class. Checking program should be menu driven.
8. Write a class to represent a vector (a linear array). Include member functions.
 - default constructor to create vector dynamically of the size 1 and initialize its element to zero.
 - parameterized constructor
 - Overload the + operator to add two vectors
 - Overload the * operator to multiply by a scalar value (scalar * vector or vector * scalar)
 - Overload the >> operator to input a vector and the << operator to display the vector in the form (10,20,...).
9. Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible).
10. Copy the string to another.
11. Reverse the string.
12. Concatenate two strings (+ operator)
13. Write a program that reads a file and creates another file which is identical to the first one except that the consecutive spaces are replaced by one space. Use command line arguments to supply the input and output filenames at runtime.
14. Implement inheritance.
15. Implement Polymorphism.

DISCRETE STRUCTURES

UNIT-I:

Set Theory: Element of set, Types of set, Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complement of Sets, Cartesian Product, Venn Diagram, Associative Laws, Distributive Laws, De-Morgan's Laws, Duality Partitioning of a Set.

Unit-II

Relation and Function: Types and Composition of relation, Partial Order Relation, Equivalence Relation, Domain and Range, Onto, Into and One-One Function, Composite and Inverse Function, Introduction of Trigonometric, Logarithmic and Exponential Function.

Unit-III

Proposition: Proposition, First Order Logic, Basic Logic Operation, Logical Equivalence, Truth Table, Normal Forms, Predicates and Quantifiers, POSET, Boolean algebra and Logic Gates.

Unit-IV

Dimensional Geometry: Graph Theory, Concepts Graph, Sub graph, Bi-partite graph, Isomorphic Graph, Homo-morphic Graphs, Weighted Graphs, Shortest Paths in weighed graphs(*Dijkstra's algorithm*), Operations on Graphs, Directed Graph, Matrix Representation On Graphs, Cyclic Graphs, Tree, Rooted Tree, Labeled Graph, Weighted Graph, Decision trees or Sorting Tree, Spanning Tree, Binary Trees, Algorithms- Prim's, Kruskal.

Unit-V

Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian Group, Properties of Group, Cyclic Group, Co-set Decomposition and Related Theorem.

Text Book:

1. C.L. Liu & Mahopatra, Elements of Discrete mathematics, 2nd Sub Edition 1985, Tata McGraw Hill

Recommended Books:

1. Rosen, Discrete Mathematics and Its Applications, Sixth Edition 2006

ENGLISH COMMUNICATION

Unit 1 – Functional Grammar: Preposition (time, place & direction), **Modals** (can, could, may, might, would, should, must, need, ought to, could have, should have, would have, used to), **Tenses** (Present, past & Future).

Progress Test

Unit 2 – Introduction to Communication: Definition of Communication, Communication Process, Types of Communication (**Verbal** - oral & written & **Non-Verbal** – Kinesics, Oculistics, Haptics, Chronemics & sign language), Barriers to Communication.

Progress Test

Unit 3 - Listening & Speaking skills: Listening Process, Listening Comprehension, Types of listening, Monologue & Dialogue, Personal Introduction, Group Discussion, Debate, Public speaking.

Progress Test

Unit 4: Reading & Writing Skills: Reading strategies, Reading Comprehension, Close reading, Summarizing, Report Writing, Features of good Report, Note taking & note making, Letter writing (Business Letters, Job Application & Resume Writing), Components of Business letter, Slogan writing, Advertising.

Progress Test

Unit 5 – Indian Writing in English:

- 1) Khushwant Singh: **Portrait of a lady.**
- 2) Premchand: **The Shroud.**

Progress Test

References

- 1) Fluency in English – Part II, Oxford University Press, 2006.
- 2) Business English, Pearson, 2008.
- 3) Language, Literature and Creativity, Orient Blackswan, 2013

MULTIMEDIA TOOLS AND APPLICATION

Unit-1

Introduction to Multimedia - Multimedia system, components and applications, Text, types of text, font and faces, using text in mm font designing and editing tools, hypermedia and hypertext, Ways to present text, aspects of text design, character, character set. Images, still images, bitmap, vector drawing, natural light and colors, color palettes, color models, image file formats, jpeg, bitmap, tiff, dib, eps, cif, pic, tga, aspect ratio, white balance, attributes of images, resolution, pixel depth, raster and vector graphics, hue and saturation, Photoshop: Photoshop's environment, Color modes, Images modes

Unit-II

Sound: - Multimedia systems sounds, Basic sound concept, types of sound, digitizing sound, computer representation of sound (sampling rate, sampling size, quantization). Audio formats, MIDI, MP3, 3D sound, Digital audio, audio recording, voice recognition and response. Sound Forge - Workspace of sound forge. Creating timeline: - Importing, extracting audio files, basic tools of editing and shortcut commands, Recording process - Recording attributes, fade, volume, silence.

Animation - Principle of animation, animation techniques, animation development process, types of animation 2D and 3D animation, Animation technique - 2D and 3D animation techniques, Animation file formats -.dir, der, fli, .max, .pics, .gif, .swf. Flash- Workspace of flash.

Unit-III

Video: How video works, Broadcast Video Standards: NTSC, PAL, SECAM, ATSC, DTV, HDTV, IPTV, Analog and Digital video, Digital video standards: ATSC, DVB, ISDB, video recording and shooting videos, video editing. Video file formats, MPEG, 3GP, AVI, Quick time, real video VHS, camera. Adobe premiere- Workspace of adobe premiere, Creating timeline: Importing, Capturing Video Files, Basic Tools of Editing And Shortcut Commands, Applying Various Effects, Cut, Fade, Mix And Wipe, Getting Output.

Unit-IV

Multimedia Authoring Tools: Introduction, factors for selecting of an authoring tools, director, hyper card, Aimtech, Link way etc. Types of authoring tools, stages in designing and producing, multimedia, products, planning and distribution of multimedia project.
Compression: Lossy and lossless. Image - LZW, JPEG, RLE, Audio - Differential pulse Coded modulation (DPCM), Video- MPEG1, MPEG2, MPEG4.

Unit-V

Dynamic web designing(Dream viewer):- HTML basics , website and pages , text formatting , tables , images ,links , the basic dream viewer environment, creating a site profile, the importance of site profile , organizing files and folders, folder and file naming rules, creating folder and web page file, implementation/coding process.

Opening a file for editing, titling pages, creating, division, adding headings, paragraphs versus line breaks, tags - logical versus physical, list, linking to other websites, linking to the user files, inserting images on web pages, changing images into links, adding an E-mail link.

Text Book

1. Multimedia tools 2nd edition Pragya Publication.
2. Encyclopedia of Multimedia 2nd edition by "Borko Furht" Springer Publication.

List of practical Multimedia tools and application

1. Resizing, cropping and selecting a image using Photoshop.
2. Working with layers of images in the Photoshop.
3. Liquefying, Auto leveling, auto color, auto contrast and brightness of the image in Photoshop.
4. Changing mode, adding text, blurring of image, clone stamp tool in Photoshop.
5. Understanding different sound channels.
6. Mixing different sound samples using sampling of sound in Sound Forge
7. Creating a Simple Flash animation using different tools in Macromedia Flash.
8. Using heading tags create a simple web page in HTML.
9. Simple Video Editing Using Adobe Premier.
10. Creating a Dreamweaver Page using different HTML tags.

INFORMATION SECURITY AND CYBER LAWS

Unit-1

Security principles, threats and attack techniques: Cyber Security, Cyber Security policy, Information security, Security triad: Confidential, Integrity, Availability, Security threats and attacks, threats security, Weak / Strong Passwords and Password Cracking, Insecure Network connections, Malicious Code, Programming Bugs, Different Viruses and worms.

Unit2

Authentication and access control: Identification, Authentication, Authentication by passwords, Access control structures, Types of access control.

Cryptography and Network security: Cryptographic mechanisms, Digital signatures, Encryption, digital signature certification, suspension and revocation of digital signature certificate, Protocol design principles, Firewalls, Intrusion detection, Active/ Passive–Interference, Interception, Impersonation, Worms.

Unit-3

Protection measures: Business risk analysis, Prevention, detection and response, Security Policies, Security Procedures and Guidelines, Business Continuity and Disaster Recovery.

Legal and Ethical Issues: Protection of data and Information Laws, Employees rights, Software failure, Computer Crime, Privacy, and Ethics

Unit-4

Cyber-crime and IT Act: Cyber Governance Issues, Cyber User Issues, Cyber Crime and Offences, Overview of IT Act, 2000, Amendments and Limitations of IT Act, Electronic Governance, Legal Recognition of Electronic Records, Cyber Crime and Offences, Concept of domain names, new concept in trademark and dispute, cyber-squatting, reverse hijacking, spamming.

Unit-5

Hacking: Introduction of hacking, hacking, criminal hacking vs. Ethical hacking.

IPR: Ethical Issues in intellectual property right, copy right and related rights, patent and related rights, Trade Marks and rights arising from Trademark registration, software piracy, plagiarism. Indian Legislations for the protection of various types of Intellectual Properties, Database, web and Mobile Security, Authentication in distributed systems

Text Books:

1. Cyber Laws and Cyber Security in developing and emerging economies, Zeinab Karake-Shalhoub, Luna Al Qasimi
2. Computer Security, Dieter gouman, John Wiley & Sons

Reference Books

1. Computer Security: Art and Science, Mathew Bishop, Addison-Wisley
2. Computer Security, 2nd ed. Author: Dieter Gollmann Publisher: John Wiley & Sons, 2006 ISBN: 0-470-86293-9

Semester 3

S.NO.	PAPER CODE	SUBJECT NAME	#L	#T	#P	# CREDITS
1	95CA301	Data Structures	4	0	0	4
2	95CA302	Operating System	3	1	0	4
3	95CA303	Computer Networks	4	0	0	4
4	95CA305	Programming in JAVA	4	0	0	4
5	95CA304	Accounting with Tally	3	0	0	3
1	95CA351	Data Structures (LAB)			3	2
2	95CA352	Computer Networks (LAB)			3	2
3	95CA353	Accounting with Tally (LAB)			2	1
4	95CA354	Programming in JAVA (LAB)			2	1
		TOTAL CREDITS	21	01	10	25

DATA STRUCTURE IN C

Objective: Assess how the choice of data structures and algorithm design methods impacts the performance of programs. Choose the appropriate data structure and algorithm design method for a specified application. Solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, tournament trees, binary search trees, and graphs and writing programs for these solutions.

Unit – 1

Introduction to Data Structures: Definition, Classification of data structures: primitive and non-primitive, Operations on data structures, **DMA**-Meaning of static and dynamic memory allocation. **Recursion:** Definition, Writing Recursive programs.

Stack –Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations Conversion of an arithmetic expression from Infix to postfix, Applications of stacks.

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

Unit – 2

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

Unit – 3

Trees-Basic terminology, binary tree, binary tree representation, complete binary tree, Extended binary tree, Array and linked list representation of a binary tree, Traversing binary trees, Threaded binary tree, B-tree, AVL tree, Insertion and deletion in binary search tree, forest, conversion of forest into a tree, heap definition.

Unit – 4

Sorting- types of sorting, Bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort.

Searching Techniques: sequential search, Binary search, Comparison between sequential and binary search.

Unit – 5

Graphs-Definition, graph representation-adjacency matrix, adjacency list, adjacency multilist, traversal DFS, BFS, minimum spanning tree, shortest path algorithm, Kruskal and prim's algorithm.

Hashing Techniques: Hash function, Address calculation techniques, Common hashing functions, Collision resolution, Linear probing,

Text Books:

1. G.S. Baluja, Data structure and algorithm

Reference book

1. Peter Bras, Advanced Data structure

List of Practical

1. STACKS DATA STRUCTURE PROGRAMS
2. QUEUES DATA STRUCTURES PROGRAMS
3. LINKED LISTS DATA STRUCTURE PROGRAMS
4. TREES DATA STRUCTURES PROGRAMS
5. GRAPHS DATA STRUCTURE PROGRAMS
6. EXPRESSION CONVERSION
7. SEARCH PROGRAMS
8. SORTING PROGRAMS

Operating Systems

OBJECTIVE: The student will learn what operating systems are, what they do, and how they are designed and constructed. The student will be introduced to what the common features of an operating system are, what an operating system does for the user, and what it does for the computer-system operator.

Unit – 1

Introduction-What is operating system? System calls, types of system calls, Operating system architecture, Operating System service. Simple batch systems, multi-programmed batches Systems, Time sharing systems, Personal computer systems, Parallel systems, distributed Systems, Real time Systems, multitasking, Client-server system, peer-to-peer systems

Unit – 2

Process-Process concept, process Scheduling, operation on processes, PCB, Inter-process Communication.

Thread-Concept of thread, multithreading, context switching, Scheduling criteria, types of Scheduling, long term, short term and medium-term scheduling, scheduling algorithms, multiple processor scheduling.

Unit – 3

Deadlock-definition, deadlock characterization, handling of deadlock, deadlock prevention, avoidance, detection and recovery.

Unit – 4

Memory Management-Logical Vs. Physical Address Space, Swapping, contiguous allocation, Paging, Segmentation, Virtual Memory, demand Paging, Performance of demand paging, page replacement, Page replacement algorithm, thrashing.

Unit – 5

Secondary storage Structure-Disk structure, disk Scheduling, disk management, swap space management, disk reliability. What is File? Attributes of file, types of file, Directory structure, and RAID structure, File System-Access control, Allocation Methods, Free Space Management

Advance Topics: Network Operating System

Text Books

1. Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.

Reference Books:

1. William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.

Computer Network

OBJECTIVE: This course has been taught to the students to aware about the computer network, and communication. Students will know about the delivery to date from one end to another end.

Unit – 1

Introduction: Definition Internetwork, Intra-network, Extra-network, Brief History, ARPANET, OSI, ITU-T.

Network Models: ISO-OSI reference model, TCP/IP Protocol Suite, ATM model, SNA model

Unit – 2

Physical Layer: Design Issues, Hub, Repeater, data, signals, bit-rate, baud-rate, bandwidth, Modulation (A2A, A2D, D2A, D2D), Multiplexing, Physical specification, Transmission modes, modes of transfer, Transmission media (Guided and Unguided), Multicasting, Broadcasting, Unicasting.

Unit – 3

Data Link Layer – Design issues, Bridge, Switch, LAN Topologies, Error Control, Error detection and correction, Flow Control, Access Control, ARQ, CSMA, CSMA/CD, CSMA/CA, MAC sub-layer, LLC sub-layer, MAC addressing, framing, Ethernet, Bit-oriented Protocol, Character-oriented Protocol, Polling And Selecting.

Unit – 4

Network Layer-Design Issues, Router, Routing, Types of Routing, Static and Dynamic Routing, Packets, IP packet, logical addressing, IPV4 vs. IPV6, IP addressing, CIDR, sub-netting.

Unit – 5

Transport Layer – Design Issues, end-to-end delivery, Error control, flow control, TCP protocol, UDP protocol, TCP packet, UDP datagram, Congestion control, Quality of service, Port Addressing, Segments & reassembly, Gateway, Protocol Convertor.

Advanced Topics: Network Cables

Text Books:

1. Data Communications and Networking, Behrouz A. Forouzan, 3rd Edition, Tata Mc graw- Hill.
2. Understanding Data Communications and Networks, William A Shay, 2nd Edition, Vikas Publications.

LIST OF PRACTICALS

1. Design and study of Straight-Through Cable.
2. Design and study of Cross-over Cable.
3. Design and study of Roll-over Cable.
4. Study of Network Command in Windows operating system.
5. Study of CISCO Packet Tracer Software.

Java Programming

Objective:

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. Be aware of the important topics and principles of software development.
4. Have the ability to write a computer program to solve specified problems.
5. Be able to use the Java JDK environment to create, debug and run simple Java programs

Unit – 1

History and Evolution of Java: Creation of Java, Java Byte Code, Java Virtual Machine, Difference between Java and C++, Java program structure, Java Tokens. Overview of Java: First simple program of Java, Implementing Java program. Data types, variables and constants: Primitive and non-primitive data type, Type conversion and casting, Operators.

Unit – 2

Control Statements: Selection statements, Iteration Statements, Jump Statements. Introduction to object-oriented programming: Defining a class, adding variables and methods, creating objects, accessing class members, constructors, method overloading, static members, Inheritance: extending a class, overriding methods, final variables and methods, final classes, finalize methods, abstract methods and visibility control.

Unit – 3

Arrays, Strings and Vectors: Arrays, one dimensional arrays, creating an array, two dimensional arrays, strings, vectors, wrapper classes. Interfaces: Introduction, Defining Interfaces, Implementing Interfaces. Packages: Java API Packages, Creating and accessing packages, Adding classes to package.

Unit – 4

Multithreading and Exception Handling: Basic idea of multithreaded programming, the life cycle of a thread, Creating thread with the thread class and runnable interface. Basic idea of exception handling: The try, catch and throw.

Unit – 5

Input/output: Exploring Java IO, file input stream, file output stream. Applets: Applet security restrictions, the class hierarchy for applets, Life cycle of applet, HTML Tags for applet. The AWT: The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Frame.

Text Books:

1. E. Balagurusamy, Fundamental of Java programming

Reference book:

1. Herbert Schildt, The Complete Reference for Java, TMH publication

LIST OF PRACTICAL

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number
3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of length in case of a two-dimensional array
5. To convert a decimal to binary number.
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and StringBufferclass like setCharAt(setLength(), append(), insert(), concat()and equals().
9. Modify the —distance class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
10. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)
11. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
12. Write a program to show the use of static functions and to pass variable length arguments in a function.
13. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
14. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
15. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
16. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
17. Write a program to demonstrate priorities among multiple threads.
18. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
19. Write a program to create URL object, create a URL Connection using the openConnection() method and then use it examine the different components of the URL and content.
20. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
21. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet's window.
22. Write a program to get the URL/location of code (i.e. java code) and document (i.e. html file).
23. Write a program to demonstrate different keyboard handling events.
24. Write a program to generate a window without an applet window using main() function.
25. Write a program to demonstrate the use of push buttons

Accounting with Tally

OBJECTIVE: To acquaint the students with basic concepts of Tally.ERP 9 and the various uses and application of such in business.

Unit-I: Accounting Concepts

Concepts of Accounting, Manual Vs Computerized Accounting, Golden Rule, Accounting Equation, journal entry, ledger account etc.

Unit-II: Trial balance and final accounts

Ledger-wise trial balance. Trading account, Profit and loss, account, Balance sheet, Outstanding, Practical work and reports

Unit-III: Fundamentals of Tally

Introduction, Creation of Company, Introduction to Gateway of Tally, Menu, Company Info menu. Accounting master: Features, configuration, setting up of account heads, voucher entries, Purchase / Sales order Receipt note, Purchase / Sales bills, Debit / Credit note Journal, Voucher, GST Bills

Unit-IV: GST and CST

Configuring GST in Tally: Creating masters, entering transactions, accounting for return of goods, rate difference in purchase/sale, exempt transactions, sales for registered and composite dealers, GST report

Configuring CST in tally: Basics of CST, Recording interstate transactions, payment of CST, CST reports.

Unit-V: Technological efficiencies in tally.erp9: Tally vault, security control, import export of data, tally audit.

Advance Topics: Management controls Concept of Control Centre. Installing tally.erp9, logging and managing control centre

Online support and help

Text Books

S.No	Name of Book	Edition	Authors' Name	Publication
1	Tally.ERP 9 in Simple Steps		Kogent Learning Solutions Inc.	Dreamtech publications
2	Tally .ERP 9 Training Guide 1st Edition	2009	A. K. Nadhani,	BPB Publications
3	Financial Accounting using tally ERP9.0	2011	A.Mansoor	Pragya Publication

Reference Books:

S.No	Name of Book	Edition	Authors' Name	Publication
1	Tally for Beginners			Tally Press

Semester 4

S.NO.	PAPER CODE	SUBJECT NAME	#L	#T	#P	# CREDITS
1	95CA401	Design and Analysis of Algorithm	4	0	0	4
2	95CA402	Software Engineering	4	0	0	4
3	95CA403	Database Management System	4	0	0	4
4		Elective 1:	5	1	0	6
1	95CA451	Minor Project-1	0	0	4	2
2	95CA452	Design and Analysis of Algorithm (LAB)	0	0	3	2
3	95CA453	Software Engineering (LAB)	0	0	3	2
4	95CA454	Database Management System (LAB)	0	0	3	2
		TOTAL CREDITS	17	01	13	26

Elective 1: (Choose any one of these)

- a. Artificial Intelligence **95CA404-A**
- b. Machine Learning **95CA404-B**
- c. Introduction to Data Sciences **95CA404-C**
- d. Cloud Computing **95CA404-D**
- e. Computational Linguistics **95CA404-E**
- f. Artificial Intelligence for Real World Application (AI) – TCS iON

Design and Analysis of Algorithms

OBJECTIVE: This course is to teach the students the basics of algorithm and the different techniques to solve problems.

Unit-1

Introduction to Algorithm: Definition, Criteria of Algorithm, Time and Space Complexity, **Asymptotic Notation:** Big Oh, Omega and Theta, Worst, Average and Best-Case Analysis, **Recurrence Relation:** Master Method, Substitution Method, RAM/PRAM, Types of Algorithm Strategies, Case Study of Insertion Sort

Unit-2

Brute-force approach: Sequential search, Selection sort, Travelling Salesman Problem
Divide-and-Conquer: Binary Search, Merge-Sort, Quick-Sort, Matrix Multiplication using Strassen's Method.

Unit-3

Dynamic Programming: Elements of Dynamic Programming, Matrix-Chain Multiplication, Longest Common Subsequence, Fibonacci Sequence, Floyd-Warshall Algorithm, Travelling Salesman Problem, 0/1 Knapsack Problem
Greedy Algorithms: Elements of Greedy Algorithm, Minimal Spanning Tree Algorithm (Prim and Kruskal), Shortest Distance Algorithm (Dijkstra), Huffman Trees for Optimal Encoding, Sudoku, Fractional Knapsack.

Unit-4

Branch and Bound: 8-Queens Problem, Graph coloring, Travelling-Salesman Problem.
Graph Traversal Algorithm: A* algorithm, BFS algorithm, DFS algorithm

Unit-5

String Matching Algorithms: Naïve Algorithm, KMP Algorithm, Finite-Automaton Based Searching, Rabin -Karp Method, Boyer-Moore Method
Advance Topics: I/O Complexity Computation

Reference Books -

1. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, Prentice Hall Publication
2. The Algorithm Design Manual by Steven Skiena, Springer Publication
3. Design and Analysis of Algorithms by Amrinder Arora, Cognella, Inc
4. Fundamentals of Computer Algorithms by Ellis Horowitz and Sartaj Sahni, W. H. Freeman Silicaon Press
5. Algorithms: Design and Analysis by Harsh Bhasin, Oxford University Press

SOFTWARE ENGINEERING

OBJECTIVE: It aims to develop a broad understanding of the discipline of software engineering. It seeks to complement a familiarity with analysis and design with knowledge of the full range of techniques and processes associated with the development of complex software intensive systems. It aims to set these in an appropriate engineering and management context

Unit – 1

Software Concepts: Introduction, characteristics, Elements of System, SDLC, The role of System Analyst, Software Application domains, Legacy Software, The Software Crisis, principles of software engineering. Requirement Analysis: Requirement analysis tasks, Analysis principles. Software proto-typing.

Unit – 2

Process models: The process of software development, waterfall, Incremental, spiral, COCOMO, concurrent development. Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis.

Unit – 3

Designing: Software Design: principles, Abstraction, Modularity, Software architecture, Cohesion and Coupling, Refactoring, Structured Analysis, Evolution of object models, **UML:** An Introduction, Views and Diagrams.

Unit – 4

Testing: Testing Techniques: software testing, functional and non- functional testing: white box, black box testing, different types of testing: static, structural, desk checking, code walk through, beta, stress, code inspection, code coverage, code complexity, statement, path, condition, function coverage,

Unit – 5

Software Quality Assurance: Quality Concepts, software quality Assurance, Garvin's Quality Dimensions, McCall's Quality factors, Software Reviews, formal technical reviews, formal approaches to SQA, Software reliability,

Text Books:

1. "An Integrated Approach to Software Engineering", Pankaj Jalote, IIIrd Edition, Narosa Publishing House.
2. "Software Engineering: A Practitioner's approach", Roger S. Pressman, McGraw-Hill.
3. "Software Engineering: Principles and Practices", Waman S. Jawadekar, Tata McGraw-Hill.
4. "Software Engineering, Ian Somerville, Pearson Education

DATABASE MANAGEMENT SYSTEM

OBJECTIVE: This course will provide you with an understanding of the design, creation, maintenance and management of a relational database management system (RDBMS).

UNIT 1

Introduction: Purpose and Advantages of DBMS, View of Data, DBMS Architecture and Data Independence, Database Languages. Classification Of DBMS, Schema and Sub Schema. Database Administrator and Users, Data Dictionary, Data Modeling using ER Model, Entities, Attributes and Relationships.

UNIT 2

Keys: Domains, Relations, Kinds of Relations, Various Types of Keys, Candidate, Primary, Alternate and Foreign Keys. Codd's Rule

Relational Algebra- Relational Algebra with Extended Operations, Tuple Relational Calculus, Domain Relational Calculus, Set Operation, Aggregate Functions, Null Values, Join Relations.

UNIT 3

Relational Database Design - Pitfalls in Relational Database Design, Trivial and Non-Trivial Dependencies, Closure Set of Dependencies and of Attributes.

Introduction to Normalization, Non-Loss Decomposition, FD Diagram, 1st, 2nd, 3rd BCNF, 4NF, 5NF.

UNIT 4

Basic SQL: DDL, DML and DCL Commands, Specifying Constraints in SQL, Select Statement.

UNIT 5

Additional features of SQL, PL/SQL, cursor, trigger, ACID properties

Views: Introduction to views, data independence, security, updates on views, comparison between tables and views

List of Practical

1. Program to perform all arithmetic operations.
2. Program to find simple interest.
3. Program to find area of square rectangle and circle.
4. Write the query for implementing: MAX(), MIN(), AVG(), COUNT()
5. Program to find whether an entered number is even or odd.
6. Program to find whether an entered number is positive, negative or zero.
7. Design a Database and create required tables. For e.g. Bank, College Database
8. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
9. Write a sql statement for implementing ALTER, UPDATE and DELETE.
10. Program to find greatest of three numbers.

ARTIFICIAL INTELLIGENCE (Elective1-a)

UNIT-1

Introduction to AI: Definitions, Goals of AI, AI Approaches, AI Techniques, Branches of AI, Applications of AI.

Intelligent Agents: Definition of a rational agent, reflex model based, utility-based agents, The environment in which particular agent operates.

UNIT-2

Problem Solving, Search and Control Strategies: General problem solving, Search and control strategies, Exhaustive searches, Heuristic search techniques, Constraint satisfaction problems (CSPs), models

Knowledge Representation, Predicate Logic, Rules: Knowledge representation, KR using predicate logic, KR using rules, Resolution, Unification Algorithm, First Order Predicate Calculus, Skolemization, Horn's Calculus, Semantic Network, Frame System And Value Inheritance, Scripts And Conceptual Dependency.

UNIT-3

Reasoning System - Symbolic, Statistical: Reasoning, Symbolic Reasoning, Statistical Reasoning,

Uncertainty: Types, degree of belief, degree of truth, probability, conditional probability, Baye's theorem, Dampster-Shafer Theory.

UNIT-4

Heuristic Search Techniques: Hill climbing, branch and bound techniques, A* algorithm, AO* algorithms, AND/OR graphs, Problem reduction, Constraint satisfaction problem, Uniform Cost search.

Game Playing: Overview, Mini-Max search procedure, Game playing with Mini-Max, Alpha-Beta pruning.

UNIT-5

Learning: What is learning, Rote learning, Learning from example: Induction, Explanation Based Learning (EBL), Discovery, Clustering, Analogy, Neural net and genetic learning, Reinforcement learning.

Expert System: Introduction, Knowledge acquisition, Knowledge base, working memory, Inference engine, Expert system shells, Explanation, Application of expert systems.

Text Books:

1. Artificial intelligence, Elaine Rich, Kevin Knight, McGraw Hill, 3rd edition

Reference Books:

1. Artificial Intelligence: A Modern Approach, Stuart J. Russell and Peter Norvig, Prentice hall, 3rd edition

Machine Learning (Elective1-b)

Introduction: Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier

Software's for Machine Learning and Linear Algebra Overview: Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using available tool such as MATLAB.

Linear Regression: Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection.

Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.

Regularization: Regularization and its utility: The problem of Over-fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.

Neural Networks: Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back propagation Algorithm.

Suggested Books:

1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2009.
2. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.
4. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

Introduction to Data Science (Elective1-c)

Unit:1

Data Scientist's Tool Box: Turning data into actionable knowledge, introduction to the tools that will be used in building data analysis software: version control, markdown, git, GitHub, R, and R Studio.

Unit:2

R Programming Basics: Overview of R, R data types and objects, reading and writing data, Control structures, functions, scoping rules, dates and times, Loop functions, debugging tools, Simulation, code profiling

Unit:3

Getting and Cleaning Data: Obtaining data from the web, from APIs, from databases and from colleagues in various formats. basics of data cleaning and making data —tidyl.

Unit:4

Exploratory Data Analysis: Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to visualize high-dimensional data.

Unit:5

Reproducible Research: Concepts and tools behind reporting modern data analyses in a reproducible manner, To write a document using R markdown, integrate live R code into a literate statistical program, compile R markdown documents using knitr and related tools, and organize a data analysis so that it is reproducible and accessible to others.

Reference Books

1. Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontline" by Schrott/O'Reilly, 2013.
2. Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking" by O'Reilly, 2013.
3. John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons, 2013.
4. Ian Ayres, "Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart" Ist Edition by Bantam, 2007.
5. Eric Seigel, "Predictive Analytics: The Power to Predict who Will Click, Buy, Lie, or Die", 1st Edition, by Wiley, 2013.
6. Matthew A. Russel, "Mining the Social Web: Data mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More", Second Edition, by O'Reilly Media, 2013.

Cloud Computing (Elective3-d)

Objectives: The objective and goal of this course is to provide students fundamental demonstration Cloud Computing which is one of the immersing trends in the field of Computer Science and Engineering.

Unit-1

Introduction to Cloud Computing: Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS , Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

Unit-2

Introduction to Cloud Technologies: Study of Hypervisors, Compare SOAP and REST, Web-services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization , Multitenant software: Multi-entity support, Multi-schema approach, Multitenancy using cloud data stores, Data access control for enterprise applications.

Unit-3

Data in the Cloud: Relational databases Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Map-reduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model.

Unit-4

Administrating the Clouds: Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence.

Unit-5

Issues in Cloud Computing: Implementing real time application over cloud platform, Issues in Inter-cloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud Quality of Service (QoS) monitoring in a Cloud computing environment, Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud.

Text Books:

1. Rajkumar Buyya, Christian Vecchiola, and S. ThamaraiSelvi, "Mastering Cloud Computing", McGraw Hill Education Pvt. Ltd.

Reference Books:

1. Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

Computational Linguistics Elective (Elective1-e)

Unit:1

Introduction Computers in linguistics and Natural Language Processing The nature and use of text corpora

Unit:2

Introduction to python programming and NLTK, Regular expressions Pattern matching Corpus search and counting

Unit:3

Regular languages Finite-state automata Operations and closure properties Pumping Lemma, Finite-state linguistics Transducers Morphological analysis

Unit:4

N-grams Language modeling Smoothing Evaluation Part-of-Speech Tagging, Word classes and tagsets Rule-based and stochastic POS tagging Hidden Markov Models Evaluation

Unit:5

Word meaning Semantic ambiguity Semantic relations Semantic roles. Computational lexical semantics, (Un)supervised word sense disambiguation Classifiers Vector-space semantics

References:

1. Jurafsky, D. and J. H. Martin, Speech and language processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition (2nd Edition). Prentice-Hall, 2008.
2. Charniak, E.: Statistical Language Learning. The MIT Press. 1996.
3. J. Allen: Natural Language Understanding. Benjamin/Cummins.1995.

BCA(H) Scheme - Semester 5

S.No.	Paper Code	Subject Name	#L	#T	#P	#Credits
1	95CA501	Linux & Shell Programming	4	1	0	5
2	95CA502	Web Technologies	4	1	0	5
3	95CA503	Elective 1	4	0	0	4
4	95CA504	Elective 2	4	0	0	4
5	95CA551	Minor Project-2	0	0	4	2
6	95CA552	Linux & Shell Programming Lab	0	0	2	1
7	95CA553	Web Technologies Lab	0	0	2	1
		Total	16	2	8	22

Elective 1: (Choose any one of these)

- 95CA503-A Cryptography and network security
95CA503-C Data Communication

Elective 2: (Choose any one of these)

- 95CA504-A E-Commerce and E-Governance
95CA504-B Enterprise Resource Planning
95CA504-C Management Information System
95CA504-D IoT and its Applications (IOT)- TCS iON

BCA(H) Syllabus - Semester 5

LINUX AND SHELL PROGRAMMING

Unit-I

Introduction: What is LINUX, basic architecture of UNIX, different flavor, CUI and GUI, LINUX vs windows File system: boot block, data block, super block, Inode block & inode table, Linux file access. basic utilities.

Unit-II

File Related Commands: cat, cp, wc, ls, rm, mv, etc. Directory related command: pwd, cd, mkdir, rmdir, etc, File Permission: Security levels, Users, group and ownership of files, chmod command, editing with vi, back ground jobs, mounting and un mounting, link and unlink, Mathematical commands: bc, expr.

Unit-III

Text Manipulation: grep, egrep, sed, cut, paste, sort, split, tr, cmp, comm, diff, head, tail
User to user communication: write, mail, mesg, wall, Printing File with lp and pr

Unit-IV

Process: structure of process and process control, process states and transition, process context

Process command: ps, kill, nice etc, scheduling commands: at and crontab, sleep, wait

Unit-V

Shell programming: shell, different types of shell, default assigned shell. Shell variable, key words, environment variable, shell script, Parameter passing, for loop, while loop, until loop, if statement, case statement.

Reference Books

1. MJ Bach "Design of Unix OS"
2. Meeta Gandhi, Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C, 1st Edition, BPB Publications 1992.
3. Y Kanetkar "Unix shell programming" BPB Pub
4. Rachel Morgan. Henry McGilton "Introducing UNIX System V"

List of Practical

1. Installation of Linux
2. Working with user login and passwd
3. Working with file related commands
4. Working with directory commands
5. Mailing and messaging in Linux
6. Implementation of job scheduling
7. Shell script program to find largest of three numbers.
8. Shell script program to print the factorial of two numbers.
9. Shell script program to find whether an entered number is even or odd.
10. Shell script program to implement positional parameter passing

Web Technologies

UNIT-1

Web Servers: Introduction to Web Servers, Installation and Configuration of XAMPP, Role of Client and Server on the Web Development, Client Side and Server-Side Scripting Languages. Brief History of Internet, World Wide Web, Understanding the Word Press Framework of PHP, Design the Enquiry Page.

UNIT-2

HTML: Concepts of Hypertext, Different **HTML5** Tags & Its Elements, Input Types, Canvas, Audio, Video and Canvas Tags.

JavaScript: Introduction, Language Basics-Variables, Operators, Statements, Functions, JavaScript Events such as onclick, onmouseout, onmouseover, Form Validation.

UNIT-3

CSS: Introduction, Level of CSS Inline Style Sheet, External Style Sheet, Classes, Class and ID Method, DIV And SPAN Tags, Border, Backgrounds, Colors, Gradients, Shadows

UNIT- 4

PHP: Introduction, Data Types, PHP Syntax, Comments, Variables and Constants, Embedding PHP in HTML, PHP Functions: User Defined Functions, Strings Concatenation, Strings Functions. Arrays: Creating Array and Accessing Array Elements, Control statements, Loops, form validation & Bootstrap.

UNIT-5

Working with Forms: CRUD – Select statements, Creating Database Tables, Inserting Values, Updating and Deleting, PHP with MYSQL, Creating Connections, Selecting Database, Perform Database (Query).

References

1. Beginning PHP5, Apache, and MYSQL Web Development, Wrox Publication Edition 2005.
2. Beginning HTML, XHTML, CSS, and JavaScript, JonDuckett **Edition** 2010.
3. Web Technologies, Black Book, DreamTech Press Dream Tech Press **Edition** 2010.

Practical List:

- i. Create a web page by use of the following tags: Head, Body, bgcolor, text and submit.
- ii. Write a html program applying inline CSS.
- iii. Write a html program using class based external style sheet
- iv. Write a JavaScript program to design the simple Calculator
- v. Write a JavaScript program to find the factorial of given number
- vi. Write a JavaScript program to form validation in html.
- vii. Create a web form using PHP for login page.
- viii. Create a simple XML document with following details: Rollno, Sname, Contact, Email and Address.
- ix. Write a simple PHPscript to perform crud operations.
- x. Create a web form using PHP for enquiry details.

Cryptography and Network Security (Elective-2(a))

Objective: To make the students learn the principles and practices of Cryptography, Network Security and to enable the students understand the various methods of encryption and authentication and help them identify the application of these techniques for providing Network and System Security.

Unit-1

Introduction to Cryptography: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, and Steganography, Classical Encryption Techniques.

Unit-2

Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher, Modes of Operation.

Unit-3

Public Key Encryption: Introduction to Number Theory, Modular Arithmetic, Prime Numbers. Euler's Totient Function, Principles of public key cryptosystems, Diffie Hellman Key Exchange, RSA Algorithm, The Chinese Remainder Theorem.

Unit-4

Key Management & Distribution: Symmetric key distribution using symmetric encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public Key Infrastructure.

Unit-5

Network & Internet Security: Transport-Level Security – Web security Considerations, Secure Socket Layer and Transport layer Security;

E-Mail Security – Pretty Good Privacy, S/MIME.

IP Security – IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange

References:

1. Cryptography and Network Security: Principles and Practices, William Stallings, Prentice Hall, 5th edition
2. Cryptography and Network Security, Atul Kahate, TMH, 8th edition

DATA COMMUNICATION (Elective-2(b))

UNIT-1

Introduction to Data Communication: Components, data representation, data flow and basic model, data representation, Serial & Parallel transmission, Modes of data transmission, **Encoding:** Unipolar, Polar, Bipolar line & block codes, Data compression, Frequency dependent codes, Run length encoding, Relative encoding, LZ Compression, Image and multimedia compression. Review of analog & digital transmission methods, Nyquist Theorem.

UNIT-2

Multiplexing: FDM, TDM, WDM, Synchronous & Statistical TDM, North American digital multiplexing hierarchy, European TDM, Spread spectrum: Frequency Hopping & Direct Sequence spread spectrum, Terminal handling & polling. Switched Communication Networks, Circuit, Message, Packet & Hybrid Switching, Soft-switch Architecture with their comparative study, X.25, ISDN.

UNIT-3

Physical Layer: Introduction, Interface, Standards, EIA-232-D, RJ-45, RJ-11, BNC connector & EIA-449 digital Interface: Connection, specifications & configuration, X.21 Modem: Types, features, signal constellation, block schematic, limited distance, dial up, baseband, line driver, Group Band and Null modems etc., ITU-T V-series modem standards Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway. Study of various types of topology and their comparative study and introduction to queueing theory.

UNIT-4

Transmission Media: Transmission line characteristics, distortions, Crosstalk, Guided Media: Twisted Pair, Baseband & Broadband Coaxial, Optical fibre, Physics and velocity of propagation of light, Advantages & Disadvantages, Block diagram, Nodes and classification, Comparison, losses, light source and detectors, Construction, Unguided media: Electromagnetic polarization, Rays and waves-front, electromagnetic spectrum and radiation, spherical wave front and inverse square law, wave attenuation and absorption, optical properties of Radio waves, Terrestrial Propagation of electromagnetic waves, skip distance, free-space path loss, Radio waves, Microwave, Infrared & Satellite Communication system. Telephone Network: Components, LATAs, signaling and Services, Digital Subscriber Line: ADSL, HDSL, SDSL, VDSL, Cable TV network for data transfer.

UNIT-5

Transmission Errors: Content Error, flow integrity error, methods of error control, Error detection, Error correction, Bit error rate, Error detection methods: Parity checking, Checksum Error Detection, Cyclic redundancy Check, Hamming code, Interleaved codes, Block- Parity, Convolution code, Hardware Implementation, Checksum.

Suggested Reading:

1. Gupta Prakash C., "Data communication", PHI Learning
2. Tomasi, "Introduction to Data Communication & Networking, Pearson Education
3. Forouzan, "Data communication", TATA McGraw
4. Godbole, "Data Communication & Network", TMH
5. Miller, "Data Network and Communication", Cengage Delmar Learning

E-Commerce & E-Governance (Elective-3(a))

Unit I:

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

Unit II:

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

Unit III:

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

Unit IV:

E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, e-seva, E-government Projects Study (Smart City Projects).

Unit V:

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

References:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governance: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.
5. J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.
6. P.T. Joseph, "E-Commerce: An Indian Perspective", PHI Learning Private Limited.
7. Hanson and Kalyanam, "E-Commerce and Web Marketing", Cengage Learning India.

Enterprise Resource Planning (Elective-3(b))

Objective: This course is taught to know about resource planning in organization and how it works.

UNIT I

Enterprise Resource Planning, Introduction-What Is ERP, Need of ERP. Advantage of ERP, Growth of ERP.

UNIT II

ERP Modules and Vendors Finance Production Planning, Control and Management, Sales and Distribution Human Resource Management Inventory Control System, Quality Management , ERP market, Comparison of Current ERP Packages and Vendors, like SAP, Oracle, PeopleSoft, BAAN etc, Disadvantages of non-ERP sys, Importance of ERP, vice versa In-house applications Benefits of integration Standardization of data code.

UNIT III

ERP Implementation Life Cycle Evaluation and selection of ERP package Project planning, Implementation, Team Training and Testing End User Training and Going Live Post Evaluation and Maintenance Role of organization management & vendor

UNIT IV

ERP Case Studies, Post Implementation review of ERP, packages in manufacturing, Services and Other Organizations, Customization of ERP for different types of Industries.

UNIT V

Security and Ethical Challenges Ethical responsibilities of Business Professionals – Business, technology; Computer crime – Hacking, cyber theft, unauthorized use at work; Piracy – software and intellectual property; Privacy – Issues and the Internet Privacy; Challenges – working condition, individuals; Health and Social Issues, Ergonomics and cyber terrorism.

References

1. ERP, Leon Alexis, TMH
2. Enterprise Resource Planning & Management of Information System, CSV Murthy, HPH.

Management Information System Elective-3(c)

Objectives: The course provides students a fundamental understanding of management information systems concepts and their role in contemporary business. At the end of this course students should be able to participate in information systems development as an informed person

Unit – 1

Management Information Systems - Need, Purpose and Objectives -Contemporary Approaches to MIS - Information as a strategic resource - Use of information for competitive advantage - MIS as an instrument for the organizational change Information, Management and Decision Making - Models of Decision Making -Classical, Administrative and Herbert Simon's Models - Attributes of information and its relevance to Decision Making - Types of information

Unit – 2

Information Technology - Definition, IT Capabilities and their organizational impact - Telecommunication and Networks - Types and Topologies of Networks -IT enabled services such as Call Centers, Geographical Information Systems etc. FIS, Mis, HRIC, HRA.

Unit – 3

Systems Analysis and Design - Systems Development Life Cycle – Alternative System Building Approaches - Prototyping - Rapid Development Tools – CASE Tools – Object Oriented Systems (Only introduction to these tools & techniques)

Unit – 4

Decision Support Systems - Group Decision Support Systems – Executive Information Systems - Executive Support Systems - Expert Systems and Knowledge Based Expert Systems - Artificial Intelligence

Unit – 5

Management Issues in MIS - Information Security and Control – Quality Assurance - Ethical and Social Dimensions, Corporate Social Responsibility, - Intellectual Property Rights as related to IT Services / IT Products - Managing Global Information Systems.

References:

1. Management information system, Pearson Publication
2. Management information system, TMH publications

BCA (H) Scheme
Semester 6

S.NO.	PAPER CODE	SUBJECT NAME	#L	#T	#P	CREDITS
1	95CA601	.Net Technologies	4	1	0	5
2	95CA602	Current Trends and Technologies	5	0	0	5
1	95CA651	Major Project	0	0	6	3
2	95CA652	Seminar and Presentation	0	0	1	1
3	95CA652	.Net Technologies- Lab	0	0	3	2
		TOTAL CREDITS	9	1	10	16

BCA (H) - Semester 6 Syllabus

.NET Technologies

Unit-1

Introduction to .Net - .Net Framework Features & Architecture, CLR, Common Type System, MSIL, Assemblies and Class Libraries, .NET languages and Benefits of .NET Application. Garbage Collection, Metadata and Intermediate Language, Name spaces Different types of .Net applications.

Unit-2

Introduction to VB.Net: Language Features forms and controls, creating .NET Projects Creating Classes in VB.NET

Introduction to Windows Forms: Benefits of Windows Forms, .NET Events, The Windows Forms Model, Creating Windows Forms, Windows Forms Properties and Events, Dialogs, ToolTips, windows controls, MDI Form

Unit-3

C#.Net: Overview of C#, Visual C#.NET .Net Development Environment, C# and windows application, C# and console application, Use Console Applications, Generating Console Output, Processing Console Input, Creating Classes, Overloading, Constructors, Inheritance, Controlling scope and visibility.

Unit-4

Web based software development: Introduction to Web servers, IIS configuration, ASP.NET Controls, ASP.NET Web Form Controls, accessing controls Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box, calendar etc.

Validation controls: RequiredFieldValidator, Range validator, RegularExpressionValidator, CompareValidator. Session and state management.

Unit-5

ADO.Net: Architecture of ADO.Net-connected and disconnected, .Net Data provider, Working with Command and DataReader, Working with DataAdapter and DataSet, Binding data in data grid view.

Introduction to XML: Accessing data from XML document, Introduction to Web Service, Creating Web service in .Net.

References:

1. ASP.Net 3.5 Black Book (Covers C# and VB 2008 Codes) - DreamTech Publication
2. The Complete Reference ASP.Net By Mathew Macdonald - TMH
3. Professional ASP.Net- Wrox Publication
4. Kothari Nikhil and Datye Vandana, Developing ASP .NET Server Controls and Components, Tata McGraw Hill, 2003.
5. Esposito Dino, Applied XML Programming for Microsoft .NET, Tata McGraw Hill, 2003.

List of Practical

1. Write a VB.Net program for calculator.
2. Write a VB.Net program for implementation of class.
3. Write a program to implement MDI.
4. Implementation of dialog boxes.
5. Write C# code to implement inheritance.
6. Write C# program to implement operator overloading.
7. Create a web page with use of different validation controls.
8. Write code for ADO implementation.
9. Write a program to access data from XML file.
10. Program for use of XML web service.

Current Trends and Technologies (BCA/BScIT)

Unit-I

Python: Introduction, Data types and Operators, Python Statements and Conditionals, Functions. Strings, Object oriented programming with Python, Errors and Exception Handling, File handling, Regular expression, Modules and Package.

Unit-II

Android: Introduction to Android. Smartphone features, Installing the SDK.,Creating Android Emulator, Installing Eclipse. Installing Android development tools. Android Life cycle. Android applications structure, Android controls, Option Menu. Database (SQLite database). Creation of .apk file.

Unit-III

AngularJS: Introduction, History, Expressions, Modules, Directives, Data Binding Controllers, Scope, Filters, Services, Global API, forms and events, Form Validation applications, Introduction to NodeJS

Unit-IV

IOT: Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs. Challenges in IoT, Domain specific applications of IoT, Overview of Arduino platform, Raspberry Pi (RPi)

Unit-V

Introduction to web technologies - Web languages, Web Hosting, Domain Name Server (DNS), Types of Web Hosting Services, Features of a Hosting Plan, Web Server - Linux or Windows. Overview of Internet Security, Firewalls, Internet Security Privacy and Copyright Issues, Basics of Asymmetric Cryptosystems, AWS.

Reference books

1. Pro AngularJS -By Adam Freeman
2. AngularJS Web Application Development Cookbook - By Matt Frisbie
3. AngularJS Programming by Example - By Agus Kurniawan
4. Angular JS: Up and Running - O'Riley Media