SYLLABUS

Bachelor of Computer Applications

1st SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name BCA 1st Semester
Subject Code: CS-1201
Subject Name: Fundamentals of Programming and Problem Solving through C-I

Aim of the Subject

Aim of this course is to understand and solve logical & mathematical problems through C language. Strengthen knowledge of a procedural programming language. Design and develop solutions to intermediate level problems using the C language. Further develop

Objectives

- To understand various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To develop skills to solve complex and logical problems.
- To enable students for software development using C programming.
- To develop the basic programming constructs in order to easily switch over to

any other language in future.

Learning Outcomes

- Introduce the concept of a program (i.e., a computer following a series of instructions).
- Introduce the concept of an algorithm (that is, a series of steps that can be carried out in a mechanical way) and a few specific examples of algorithms (for example, finding an average, sorting, searching).
- Introduce the concept of a variable holding a value, how a variable is declared

and how it can be changed.

Introduce the concept of a loop – that is, a series of statements which is

- written once but executed repeatedly- and how to use it in a programming language.
- Be able to use a conditional statement to select a choice from two or more alternatives
- Be able to break a large problem into smaller parts, writing each part as a module or a function
- Be able to use an array to store multiple pieces of homogeneous data, and use

a structure to store multiple pieces of heterogeneous data

- Introduce the concept of Pointers Structures, Union and File handling

Unit 1

Introduction to Computer-Based Problem Solving : Problem Identification, Definition and Problem Solving Strategies. Program, Features of Good Program. Structured Programming and modular Programming, Classification of Programming Languages : Low-level, High –level language, Programming Environment : Assemblers, Compiler, Interpreter, Linker, Loader.

Program Design with Flow chart and Algorithm : Symbols in flowcharts, Importance of Flowchart, Writing algorithm, Importance of Algorithm, Developing and debugging flowchart for programming problem.

Unit 2

Fundamentals of C Programming : Overview of C, History of C, Structure of a C Program, C character set, Identifiers and Keywords, Data types, Primitive data types in C, Choosing data type, Variables and Constants, Variable declaration and initialization, Type Specifier, Constant declaration.

Operators and Expressions: Arithmetic operators, Logical operators, Relational operators, assignment operator and conditional operators, Expression, Implicit and explicit type conversion, Evaluation of expression (Precedence and Associativity).

Unit 3

Basic Input/Output Operations: Formatted I/O, printf() and scanf() functions, Unformatted I/O, getchar(),putchar(),gets() and puts() functions.

Control Constructs: Sequence Control Structure, if- else statement, switch-case statement, Loop Control Structure, while loop, do- while loop, for loop, Jump Statements, break, continue, goto, return

Unit 4

Array: Array Declaration and initialization, Array operations (like traversal, searching an element, sorting array elements), 2 D Array and multidimensional array, Declaration and initialization, Matrix operations, Advantages and limitations of Array, String

Unit 5

Function: User defined Function, Function declaration, definition and call, Actual and formal Arguments, Function with arguments and without arguments, Communication between function, Recursion, Self and Mutual recursion, Iterative vs. recursive function.

Text Book(s)

1. . Herbert Schildt, C The Complete Reference, Osborne/ Mc Graw-Hill,4th Edition,2000.

2. Behrouz A. Forouzan, Richard F. Gilberg, Computer Science: A Structured Programming Approach Using C, Thomson Brooks/cole, 3rd Edition,2007.

Reference Material(s)

1. . B.W. Kernighan, D.M. Ritchie, The C Programming Language, Prentice Hall ofIndia, 2nd Edition, 1988.
2. E Balagurusami, Programming in ANSI C, Tata McGraw-Hill, 6 th Edition, 2012.
3. Byron S Gottfried, Programming with C, Tata McGraw-Hill, 3rd Edition, 2010.
4. Yashavant Kanetkar, Let us C,BPB Publications, 13th Edition, 2013.
5. Yashwant Kanetkar, Test your C skills, BPB Publication, 5th Edition, 2005.

Course Name BCA 1st Semester
Subject Code: CS-1101
Subject Name: Mathematics-I

Aim of the Subject

To enable professional undergraduate students to understand the importance of mathematics in computer science.

Objectives

1. To make the students understand : basic concepts of differential calculus, integral calculus and its applications, differential equations, matrices, boolean algebra, fuzzy logic etc.
2.To make the students understand applications of mathematics in computer science.

Learning Outcomes

Students will come to understand the importance of mathematics in computer science.

Unit 1

Basic of calculus, Maclaurin's and Taylor's series, Partial differentiation, Euler's theorem and its application in approximation and error, Maxima and minima of two variables, tangents and normals, subtangent and subnormal, Curvature, radius of curvature, centre of curvature (Cartesian and polar co-ordinates)

Unit 2

Definite integral as limit of a sum, Application in Summation of series, Double and Triple integrals, change of order of integration, beta and gamma functions. Length of the curve, volume and surfaces, using double and triple integral.

Unit 3

Ordinary differential equation of first order, linear and higher degree, Linear higher order differential equation with constant coefficients. Homogeneous linear differential equation, simultaneous differential equations

Unit 4

Rank of matrices, solution of simultaneous equation by elementary transformation, consistency of equation. Eigen value and Eigen vectors, Cayley- Hamilton theorem and its application to find the inverse.

Unit 5

Algebra of logic, Boolean algebra, principal of duality, basis theorems, Boolean expression and function. Graph theory, Graphs, Sub-graphs, degree and distance, Tree, Cycles and Network, Elementary concept of fuzzy logic.

Text Book(s)

Engineering Mathematics I – Dr. D. C. Agarwal, Fifth Edition, Published by Shree Sai Prakashan

Reference Material(s)

1. . Higher Engineering Mathematics – Dr. B. S Grewal, 36th Edition, Khanna Publishers, 2001. ISBN: 8174091157, 9788174091154
2. Higher Engineering Mathematics – B V Ramana. Tata McGraw- Hill Education, 2006, ISBN: 007063419X, 9780070634190

Course Name BCA 1st Semester
Subject Code: IC-1924
Subject Name: Hindi Language

Aim of the Subject

िहंदी भाषा और स प्रेषण कौशल म वृ िध

Objectives

भाषा और सामाजिक-सां कृतिक चेतना से परिचित होना

Learning Outcomes

िव यार्थी की अपनी भाषा, समाज, इति हास, सं कृति और प्र ृति आदि को प्र त रागा मक ि ट िवकिसत होगी

Unit 1

(क) मानक िहंदी भाषा

~~(ख) अशु ियाँ और उनका संशोधन~~

Unit 2

(क) िहंदी का श द-भ डार, (ख) िहंदी की वाक्य-रचना और िवराम चि न

Unit 3

पत्र लेखन, सार-लेखन और प लवन

Unit 4

(क) भारतदेश और उसके िनवासी, (ख) भारतीय समाज की संरचना, (ग) सामजिक गतिशीलता, (घ) धमर् और दशर्न

~~**Unit 5**~~

(क) भातीय सं कृति का िव व पर प्र ाव, (ख) म यप्र ेश का सां कृतिक वैभव

Text Book(s)

भारतीयता के अमर वर

Reference Material(s)

म यप्र ेश िहंदी ग्र थ अकादमी, भोपाल

Course Name BCA 1st Semester

Course Name BCA 1st Semester
Subject Code: CS-1019
Subject Name: Basic Electrical and Electronics

Aim of the Subject

The aim is that students should have knowledge of electrical and electronics

Objectives

1. Impart a basic knowledge of electrical and electronics quantities such as current , voltage,power,energy and frequency to understand the impact of technology in a global and social context.
2. provide working knowledge for the analysis of basic AC and DC circuits.

Learning Outcomes

1. Predict the behavior of any electrical and electronics circuits
2. Formulate and solve complex AC ,DC circuits.
3. students will gain knowledge digital circuits.

Unit 1

Circuit concepts: voltage, current, power and energy, circuit, network component (active and passive, unilateral or bilateral , linear and nonlinear , lumped or distributed). Resistance parameter, inductance parameter, capacitance parameter, Series and parallel elements. Energy sources (voltage source and current source), voltage and current relations.

DC resistive circuits: Kirchhoff's voltage law, Kirchhoff's current law, Practice with Examples. Voltage Division and Current Division, Series –Parallel Network Reduction Power in a Series Circuit, Power in Parallel Circuit,

Unit 2

Network theorems : Star –Delta transformation , Ex. 1& 2 superposition theorem ,Explanation with example . Thevenin's theorem , Practice with Example maximum power transfer theorem. DC mesh and node Analysis : Mesh analysis with Example . Norton's theorem , Practice with Example. Mesh equation by inspection method. Nodal analysis, node equation by inspection method. Source transformation technique.

Unit 3

Circuit Transients: Introduction initially charged RC circuit, RL circuit with initial current. Time Constant, Equivalent RC or RL Circuits RL and RC Circuit with Sources. Series RLC Circuit: Overdamped, Critically Damped, Underdamped Condition. Example on RLC Circuit Two Mesh Circuits. Sinusoidal Circuit analysis: Introduction, sinusoidal voltage and current(instantaneous value , peak value, peak to peak value, average value, root mean square value, peak factor, form factor.

Unit 4

Element responses (phase relation in a pure resistor, inductor and capacitor). Series RL sinusoidal Response , Example. Phasors : Phasors as Complex Numbers. Series RC Sinusoidal Response , Example. Power and Power Factor : Instantaneous Power, Average Power, Apparent Power and Power Factor , Reactive Power, Power Triangle.

Unit 5

Introduction of Digital Electronics : Analog representation, Digital representation . Digital and analog systems: Advantages and Limitations of digital techniques. Digital Number Systems: Decimal system , Binary System , Binary Counting . Representing Binary Quantities, Digital Circuits/ logic circuits, Parallel and serial Transmission. Digital Computers: Block Diagram of Digital Computers, Major Part of Digital Computers. Digital Logic Gates: AND, OR, Inverter, Buffer, NAND, NOR, Exclusive-OR, Exclusive-NOR: Graphic symbol, algebraic function, Truth Table. Cascading of Gates.

Text Book(s)

1. Electric circuits, Schaum's Outline Series
2. Sudhakar and Shyammohan, Circuits and Networks, McGraw-Hill Education.

Reference Material(s)

1. B. L. Theraja,Electrical Technology, S. Chand Publication
2. D. P. Kothari and I. J. Nagrath, Basic Electrical Engineering, McGraw-Hill Education
3. . M. Morris Mano, Digital Design, Third Edition, Prentice Hall

Course Name BCA 1st Semester
Subject Code: IC-1905
Subject Name: English language and Composition

Aim of the Subject

TO Improve English Language Proficiency

Objectives

To develop communicative competence and grammatical competence of the students.

Learning Outcomes

student should be able use the language effectively.
develop the language skills

Unit 1

literature
Where the Mind is Without Fear
2. A Hero
3. Tryst With Destiny
4. Indian Weavers
5. The Portrait of a Lady
6. The Solitary Reaper

Unit 2

Basic Language Skills:
Countable and Uncountable Nouns,
Verbs, types of verbs
Tenses,
determiners,
adjectives
Adverbs
prepositions
conjunctions

Unit 3

Basic Language Skills,
Vocabulary: Synonyms, Antonyms,
Word Formation, Prefixes, Suffixes,
Confusing Words, Misused Words,
Similar Words with Different Meanings

Unit 4

sentence , hierarchy of sentence, phrases, types of phrases, classification of sentence based on function and structure, parts of sentences

Unit 5

Composition and Paragraph Writing, types of paragraph, descriptive paragraph

Text Book(s)

Text Book: English Language and Literary Heritage of India, Foundation course (English Language) Published by Commission for Scientific and Technical Terminology and M P Hindi Granth Academy Edition first (2017)

Reference Material(s)

English usage- Michael swan, English grammar and composition Wren and martin

Lab Manual

Fundamentals of Programming and Problem Solving through C - 1

1. Write a C program to display "Hello Computer" on the screen.
2. Write a C program to display Your Name, Address and City in different lines.
3. Write a C program to find the area of a circle using the formula: Area = PI * r*r.
4. Write a C program to find the area and volume of sphere. Formulas are:
   Area = 4*PI*R*R Volume = 4/3*PI*R*R*R.

5. Write a C program to print the multiply value of two accepted numbers.
6. Write a C program to convert centigrade into Fahrenheit. Formula:
   C= (F-32)/1.8.

7. Write a C program to swap variable values of i and j.
8. Write a C program to find the maximum from given three nos.
9. Write a C program to find that the accepted no. is Negative, Positive or Zero.
10. Write a C program to calculate sum of 5 subjects & find percentage.
11. Write a C program to use switch statement. Display Monday to Sunday.
12. Write a C program to display arithmetic operator using switch case.
13. Write a C program to print month from January to December using switch case.
14. Write a C program to reverse a given number.
15. Write a C program to print a table of any number.
16. Write a C program to find out the sum of series 1 + 2 + …. + n.
17. Write a C program to find out the sum of series 1^2 + 2^2 + …. + n^2.
18. Write a C program to display first 10 natural no & their sum.
19. Write a C program to print Fibonacci series up to 100.
20. Write a C program to find factorial of a number.
21. Write a C program to find whether given no is a prime no or not.
22. Write a C program to display sum of series 1+1/2+1/3+.....+ 1/n.
23. Write a C program to use bitwise AND operator between the two integers.
24. Write a C program to convert decimal to binary.
25. Write a C program to convert decimal to octal.
26. Write a C program to convert decimal to hexadecimal.

27. Write a C program to find the sum of first 100 natural nos.
28. Write a C program to find the sum of first 100 odd nos. and even nos.
29. Write a C program to display first 25 Fibonacci nos.
30. Write a C program to display first 100 prime nos.
31. Write a C program to find the sum of digits of accepted no.
32. Write a C program to print all the factors of accepted no.
33. Write a C program to find all the prime numbers between two given numbers.
34. Write C programs to print the terms of each of the following series:
    i. Sin(x) ii. Cos(x) iii. Log (1+x) iv. log (1-x) v. ex vi. e-x
35. Write a C program to print the sum of series.(will be given in class)
36. Display the following output on screen (assuming the value for input parameter n=5) :

a.	b.	c.	d.	e.
*	1	A	1	1
**	12	AB	23	2 3
***	123	ABC	345	4 5 6
****	1234	ABCD	4567	7 8 9 10
*****	12345	ABCDE	56789	11 12 131415
f.	g.	h.	i.	j.
*****	ABCDE	*	1	1
****	ABCD	***	123	121
***	ABC	*****	12345	12321 1234321
**	AB	*******	1234567	123454321
*	A	*********	123456789	

k.	l.	m.	n.	o.
* ** *** **** *****	ABCDE ABCD ABC AB A	1 12 123 1234 12345	***** 0000 *** 00 *	1 10 101 1010 10101
p. 1 01 101 0101 10101	q 1 22 333 4444 55555	r. A AB ABC AB A	s. ABCDEDCBA ABCD DCBA ABC CBA AB BA A A	t. 1 121 12321 1234321 123454321
u. *	v. 1 2 3 4 5 2 3 4 5 1 3 4 5 1 2 4 5 1 2 3 5 1 2 3 4	w. 5 4 3 2 1 4 3 2 1 3 2 1 2 1 1	x. * * * * * * * * * * * * * * *	y. 1 2 3 4 5 1 5 1 5 1 5 1 2 3 4 5

37. Write a C program to find minimum, maximum, sum and average of the given one dimensional array.
38. Write a C program to perform the basic Matrix operations as addition, subtraction, multiplication, Transpose.
39. Write a C Function for the following task.
    a. Calculating Factorial
    b. Find value of a given Fibonacci term
    c. Swapping the values of two variable

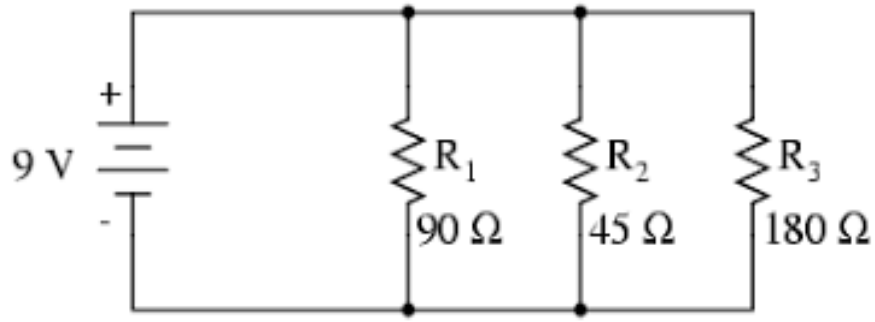
d. Minimum/maximum value from the given input

40. Write the following recursive C Function
    a. Factorial of a given number
    b. N th Fibonacci number
    c. Reverse of a give Number

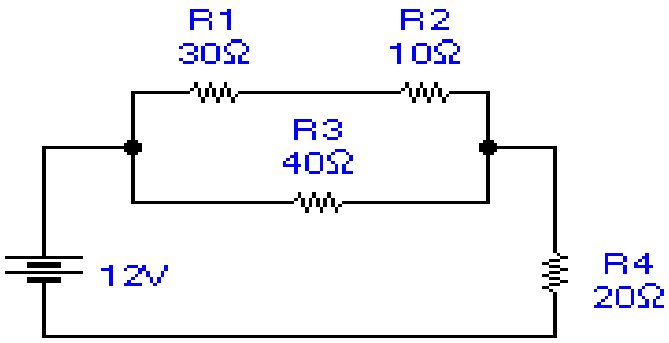
Assignment: CS-1019 Basic Electricals and Electronics

Question 1:- **consider a parallel circuit which consists of three resistors with resistance 5Ω, 10Ω, 5Ω respectively with a 15v battery.**

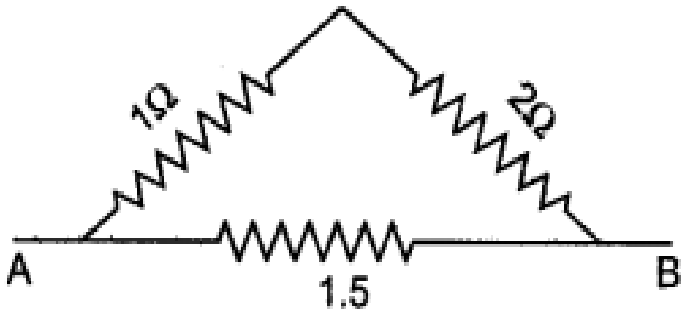
Question 2:- **calculate current I**

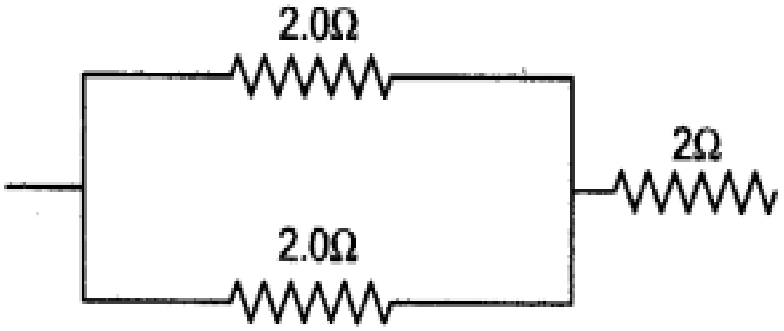


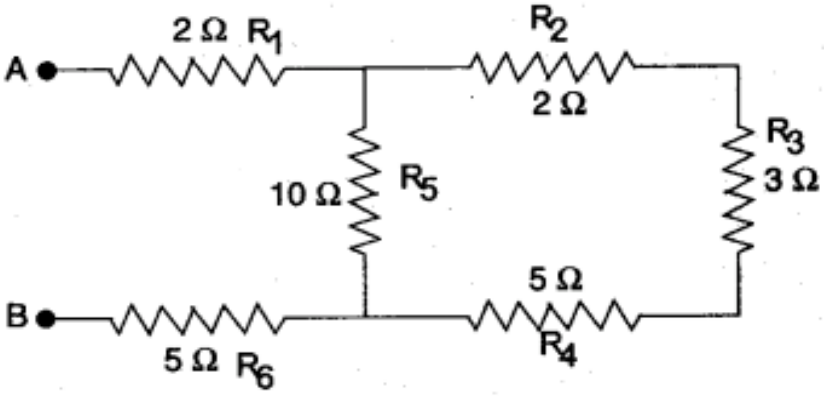
Question 3:- calculate current I

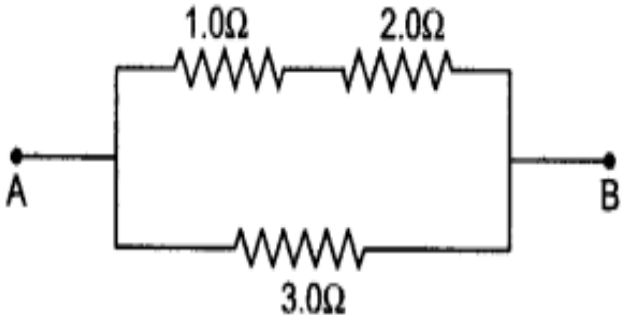


Question 4:- In given figure , calculate the effective resistance between the points A and B




2.0Ω
2Ω
2.0Ω


2 Ω R1
R2
A
2 Ω
R3
3 Ω
10 Ω
R5
5 Ω
B
5 Ω R6
R4


1.0Ω
2.0Ω
A
B
3.0Ω

SYLLABUS

Bachelor of Computer Applications

3rd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

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Course Name BCA 3rd Semester
Subject Code: CS-2021
Subject Name: Digital Electronics

Aim of the Subject

To impart basic knowledge in digital logic and circuits and to introduce basic concepts of data communications.

Objectives

To review basic electronics concepts
To review data representation techniques
To introduce student to basic concepts of digital logic
To introduce students to the design of basic logic circuits
To introduce students to some commonly used combinational and sequential circuits

Learning Outcomes

To be able to understand Basic Digital Electronics Concept .
2. To be able to analyze Electronics circuits.
3. Understand and analyze circuits with Different Technologies.

Unit 1

Unit I
Introduction to Digital Computers, Difference between Analog and Digital Computer, number system. Binary codes and their representation. Computer Arithmetic: Binary representation of Negative Integers using 2's complement and Signed magnitude representation, Fixed point Arithmetic operations on Positive and Signed (Negative) Integers like addition, subtraction multiplication.

Unit 2

Signed multiplication, Booth algorithm for multiplication. Division of positive and negative binary numbers. Boolean Algebra and Logic Gates: Basic Definitions, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and standard forms, Other Logic operations, Digital Logic gates, Integrated Circuits.

Unit 3

Gate- Level Minimization: The K- Map Method, 3 and 4 variable K- Map, Product of sums simplification, Sum of Products simplification, Don't care conditions, NAND and NOR implementations, Exclusive-OR function. Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary half adder, binary full adder, binary full subtractor.

Unit 4

Binary parallel adder, carry propagation delay and Propagation delay calculation of various digital circuits. Fast adder, Decimal Adder, seven segment display, BCD to excess three code converter, Decoders, Encoders, Multiplexer, and Demultiplexers. Synchronous Sequential logic: Sequential circuits, Latches, Flip Flops: SR, D, JK, T.

Unit 5

Master Slave JK Flip flop. Characteristic equations and Excitation tables of flip-flops. Analysis of clocked sequential circuits: State diagrams, State equations for D, JK and T Flip flops. Shift Registers- Serial in Serial out, Serial in Parallel out, Parallel in Serial out and Parallel in Parallel, Designing of Asynchronous (Ripple) Counters, Design of Synchronous Counters. Various terms related to integrated circuits like: Noise margin, fan in, and Fan out, propagation delay, power dissipation Digital logic families like: TTL, CMOS, ECL, RTL, comparison between these families

Text Book(s)

1. . Digital Design by M. Morris Mano. Publication: PHI Eastern economy edition, 2001.
2. . Computer Architecture By Dr. Rajkamal. Publication: TMH Indian Special edition2006.

Reference Material(s)

1. Computer Fundamentals – Architecture and Organization By B. Ram. Publication: PHI Fourth edition, 2003.
2 Principles of digital communication system & computer networks, K.V.K.K. Prasad
3 Computer organization and architecture by William Stallings. Publication : PHI Fifth edition, 1999.
4 Digital systems principal and Design by Dr. Rajkamal, Publication: PHI First impression, 2006.

Course Name BCA 3rd Semester
Subject Code: CS-2222
Subject Name: Data Structures and Algorithms

Aim of the Subject

To develop proficiency in the specification, representation, and implementation of Data Structures and apply the concepts for better program design.

Objectives

- To understand object oriented programming
- To understand abstract data types
- To implement various data structures and related algorithms used in computer science.
- Profiling of the algorithms used in specific data structures.
- To understand the complexity of a algorithm.
- Study of Searching and sorting algorithms

Learning Outcomes

- Outline basic object-oriented design concepts. i.e., Inheritance, Polymorphism, Dynamic Method Binding etc.
- Explain, implement the following data structures: Lists (unordered and ordered), Stacks, Queues
- Explain and use pointers, dynamic memory allocation, and linked structures for the above listed data structures.
- Write and test procedures with linked structures.
- Explain, implement and apply the following hierarchical data structures: Binary search trees, Heaps, Graphs etc.
- Analyses sorting and searching algorithms, and explain their relationship to data structures.
- Analyses time and space complexity of algorithms.
- Choose and implement appropriate data structures to solve an application problem.

Unit 1

Data structures: Definition & Classification, Abstract data type, Arrays: Definition, representation of One and Two dimensional arrays, Operations on Arrays.

Unit 2

Stacks: Definition, Implementation. Applications of Stack, Infix to Postfix Conversion, Queues: Operations on Queues, Queue Applications, Circular Queue, Double ended queue.

Unit 3

Singly Linked List: Implementation and Applications, Representation of a Polynomial, Polynomial Addition; Circular Linked List: Implementation and Applications, Doubly Linked List: Implementation and Applications.

Unit 4

Introduction to Trees, Binary Tree, Tree Traversals: Preorder, Inorder and Postorder, Binary Search Tree, Graph: Definition of Undirected Graph and Directed Graph, Graph representation, Graph Traversal: Breadth first Traversal, Depth first Traversal.

Unit 5

Algorithm, Concept of Algorithm analysis, Time and Space Complexity, Worst case Analysis, Searching algorithm: Linear Search and Binary Search, Sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Hash Functions, Collision Resolution Techniques.

Text Book(s)

1. E. Horowitz, S. Shani: Fundamentals of Data Structures, Schuam Series.
2. . T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein. Introduction to Algorithms, 2nd edition, MIT Press, 2001

Reference Material(s)

1. D.E. Knuth: The Art of Computer Programming, Vols. 1 to 3, Addison-Wesley, Massachusetts, 1973.
2. . Aho Alfred V., Hopperoft John E., Ullman Jeffrey D., "Data Structures and Algorithms", AddisonWesley
3. Drozdek- Data Structures andAlgorithms,Vikas
4. Horowitz, S. Sahni, and S. Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 1998.
5. R. Kruse C.L. Tondo and B. Leung, Data Structures and Program design in C, PFU, 1997.

Course Name BCA 3rd Semester
Subject Code: CS-2111
Subject Name: Mathematics-III

Aim of the Subject

The aim of this course is to provide mathematical background to the students so that they can be able to solve any problem related to computer science. This course will enable them to analyse and understand any problem mathematically.

Objectives

1. Know Difference Operator, Interpolation, Numerical Differentiation & Integration, Numerical solution of differential equation and linear programming problems and Complex Variables.
2. Understand their applications.
3. Solve related simple numerical problems which enable them to understand the subject.

Learning Outcomes

Develop ability to apply knowledge of Mathematics and science in solving computational problems related with numerical Analysis: Difference operator, Interpolation, Inverse Interpolation, Numerical differentiation, Numerical Integration by using Simpson's method, Weddle's rule and Gauss Legendre open quadrate formula, Solutions of algebraic and transcendental equations (Regular false ,Newton- Raphson, Iterative, Graeffe's root squaring method), Solutions of simultaneous algebraic equations: Direct methods(Gauss Elimination Method , Gauss Jordan Method), Iterative Methods (Jacobi Iterative Method, Gauss-Seidel Iterative Method) , Solutions of ordinary differential equation (Tailor's Series, Picard's Method, Modified Euler's Method, Runge- Kutta Method, Predictor-Corrector Method),Solution of Partial differential equation , Introduction to optimization by linear programming ,only two variable problems solutions by graphical and simplex method, concept of degeneracy and duality: simple three variable transport and assignment problems . Functions of complex variables: Analytic functions, Harmonic conjugate, Cauchy - Riemann Equations, Line integral, Cauchy's theorem, Cauchy's Integral formula, singular points, Poles and Residue, Residue theorem , Evaluation of Real Integral and Bilinear Transformation.

Unit 1

Numerical Analysis: Difference operators, Errors and Approximations, Interpolation, Inverse Interpolation, Numerical differentiation, Numerical Integration by using Simpson's method, Weddle's rule and Gauss Legendre open quadrate formula.

Unit 2

Solutions of algebraic and transcendental equations (Regular False, Newton-Raphson, Iterative, Graeffe's root squaring methods). Solutions of simultaneous algebraic equations: Direct methods (Gauss Elimination Method, Gauss-Jordan Method), Iterative Methods (Jacobi I terative Method, Gauss- Seidel Iterative Method).

Unit 3

Solutions of ordinary differential equations (Tailor's Series, Picard' s Method, Modified Euler's Method, Runge-Kutta Method, Predictor-Corrector Method), Solution of Partial differential equation.

Unit 4

Introduction to optimization by linear programming, only two variable problems solution by graphical and simplex method, concept of degeneracy and duality; simple three variable transport and assignment problems and modeling into LPP.

Unit 5

Functions of Complex Variables: Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line integral, Cauchy's theorem, Cauchy's Integral formula, Singular points, Poles and Residues, Residue theorem, Evaluation of Real Integral, Bilinear Transformation.

Text Book(s)

Engineering Mathematics II, Dr. D. C. Agarwal, Fifth Edition, Published by Shree Sai Prakashan.

Reference Material(s)

1. Higher Engineering Mathematics – Dr.B.S Grewal, 36th edition, Khanna Publishers, 2001. ISBN: 8174091157, 9788174091154
2. Higher Engineering Mathematics – BV Ramana,Tata McGraw-Hill Education, 2006, ISBN: 007063419X, 978007063419

Course Name BCA 3rd Semester
Subject Code: CS-3207
Subject Name: Object oriented programming through C++ I

Aim of the Subject

To clear the concept and applications of object oriented programming language C++.

Objectives

1.To make the students understand the object oriented concepts.
2. To make the students aware of the basic syntax and the usage of C++.
3. . To make the students implement the various concept of object orientation including data abstraction, data hiding, inheritance, polymorphism etc.practically.
4. . This course will also prepare students with the necessary programmingbackground for Data Structures using C/C++ and Java programming courses.

Learning Outcomes

1.Students should be able to understand the use and implement the following:

- Classes and Objects
- Function Overloading
- Operator Overloading
- Inheritance
- Virtual Functions and Polymorphism
- Templates
- File handling

2. Student should be able to write programs/projects using Object Oriented approach
3. Student will be prepared for the technical tests related to C++.

Unit 1

Introduction to OOP' s Languages, Difference between procedure oriented and object oriented languages, characteristics of OOP's languages, application of OOP's, basic program structure, preprocessor directives. OOP's paradigm & concepts: Objects, Class, A sample C++ program with class, Defining member function, Introduction to- Data abstraction, Data encapsulation, Inheritance, polymorphism. Difference between structure and class.

Unit 2

Scope resolution operator, Constructors and Destructors, Types of constructors: Default, Parameterized, copy constructors. . Data types in C++, Data type conversion and casting, explicit and implicit type conversion, Block, Local and

Global variables, Qualifiers effecting scope and visibility of variables : Static, Auto, Extern and Register variables, Operators in C++, manipulators.

Unit 3

Access specifiers in C++ : Public, Private and Protected data member and member functions, Defining a member function of a class outside the class using scope resolution operator, inline functions, difference between macro, inline and simple function, Polymorphism: Function overloading, Operator overloading, Unary and Binary operator overloading, types of polymorphism : Compile t ime and Runtime Polymorphism,

Unit 4

Pointers, this pointer, pointer to object, Pointer Arithmetic, Pointer to object. Inheritance, types of inheritance : single, multiple , multilevel, hierarchical, hybrid inheritance, public, private and protected visibility in inheritance. Function overriding, pure virtual function Abstract class.

Unit 5

Templates: Function template and class templates. Working with Files: Introduction to Classes for File Stream Operation, Opening & Closing Files, Detection of End of File, Working with Files, Exception Handling.

Text Book(s)

Text book :

1.C++ : The Complete Reference by Herbert Schildt 4th Edition Mc-Graw Hill

Reference Books

1. Let Us C++ - 2nd edition by Yashavant Kanetkar – BPB Publications
2. Balaguruswamy Object Oriented Programming With C++ Fourth Edition Tata Mc-Graw Hill
3. The C++ Programming Language by Bjarne Stroustrup Addison-Wesley

Reference Material(s)

Uploaded on Google classroom

Course Name BCA 3rd Semester
Subject Code: IC-3913
Subject Name: Financial Accounting

Aim of the Subject

The objective of this course is to acquaint students with the accounting concepts, tools and techniques and preparation of accounts for certain businesses so that they can develop business application easily.

Objectives

The course is designed to make students:

1) Learn fundamental accounting concepts, elements of financial statements, and basic accounting vocabulary.

2) To give an in-depth knowledge of all business transactions and how they should be recorded, classified & interpreted to get a meaningful judgment of viability &
profitability of the industry.

3) Learn the concepts of journal, ledger, f inal accounts, Inventory Management, Break Even Point.

4) To develop an understanding of financial statements and the principles and concepts underlying them;

5) To lay foundation for developing the skills to interpret Financial Statements;

Learning Outcomes

Learning Outcome

The mission of the Accounting Program is to prepare students about a functional domain of accounting so that they can utilize it in technology.

1) Students will recognize commonly used financial statements, their components and how information from business transactions flows into these statements

2) Students will demonstrate progressive learning in the elements of managerial decision making, including planning, directing and controlling activities in a business environment.

3) Students will be able to understand tax issues.

4) Students will be able to demonstrate knowledge of preparation of Financial Statements and or financial schedules in accordance with Generally Accepted Accounting Principles through analysis and synthesis of information as well.

5) Students will be able to demonstrate knowledge in setting up a computerized set of accounting books for a “for profit “ entity.

6) Students will demonstrate progressive affective domain development of values, including but not limited to receiving and responding to: the role of

accounting in society, business ethics, environmental and global societal sustainability, and/or career opportunities.

7) Students will complete a Project/ Written Assignment that integrates career orientation and or professional development skills.

8) Students will be able to demonstrate knowledge of various advanced accounting issues related to Financial Accounting within a global and or ethical framework.

Unit 1

Introduction to book keeping: meaning, nature, development, objectives, merits and Difference
between book keeping and accountancy. Fundamentals of accounting: Accounting concepts and conventions. Brief introduction to GAAP and its importance. Accounting structure: the process of accounting –journal, ledger, subsidiary books.

Unit 2

Trial Balance based on Double Entry Book Keeping System.
Financial Systems and related concepts: Form and preparation of Income statements (P &L
A/C), Statement of Financial Position.

Unit 3

Methods of Depreciation – SLM Method and WDV method.
Financing Decisions : Tools of Financial Analysis : Financial Statement Analysis, Statement of
Financial position.

Unit 4

Break Even Analysis.
Leverages : operating , financial and combined. Accounting Package – Tally (Operations)

Unit 5

Inventory Management and Responsibility Accounting :
Methods of Inventory Management and Material Issues. Responsibility Accounting _ Meaning, Objectives and Importance.

Text Book(s)

1. Tulsian's Accountancy for Class XI, Financial Management by Khan & Jain.

Reference Material(s)

Reference books :
1. Financial Accounting by TS Grewal.
2. Financial Management by Khan and Jain.

3. NCERT Books on Accounting and FM for Class XI and X

Class Assignments: Digital Electronics

Assignment I (Week 1):

1) Write the first 20 decimal digits in base 4.
2) Write the first 20 decimal digits in base 3.
3) Add and multiply the following numbers in the given base without converting to decimal.
   (i) $(1230)_4$ and $(33)_4$
   (ii) $(130)_5$ and $(34)_5$
   (iii) $(230)_6$ and $(54)_6$
   (iv) $(130.4)_5$ and $(34.3)_5$
4) Write the first 100 decimal digits into binary.
5) Convert the following numbers into binary. (i) 123.56 (ii) 456.75
   (iii) 345.9 (iv) 890.9
   (v) 567.9 (vi) 668.7
6) Converts the following numbers into decimal.
   (i) 10101010 (ii) 101010110011
   (iii) 10110101.1111 (iv) 101010111.1101
   (v) 1011011010.101 (vi 111001100.1100
7) Perform the following conversion , without converting into decimal :
   (i) $(3674)_8$ to $(\ )_{16}$ to $(\ )_2$
   (ii) $(1001010101010)_2$ to $(\ )_{16}$ to $(\ )_8$
   (iii) $(AC4)_{16}$ to $(\ )_2$ to $(\ )_8$
   (iv) $(AAFF)_{16}$ to $(\ )_8$ to $(\ )_2$

Assignment II (Week 2, 3):

1) Represent the following numbers into sign magnitude representation.
   (i)-11
   (ii)15
   (iii)7
   (iv)7
   (v) 13
   (vi) 31
   (vii) 32
2) Represent the following numbers into sign two's complement representation.
   (i) -11
   (ii) 15
   (iii) 15
   (iv) 7
   (v) 7
   (vi) 13
   (vii) 31
   (viii) 32
3) Perform the M-N and N-M using two's complement

method. (i) M= 101100101 and N = 111000110
(ii) M=110011001 and N = 1010101010 (iii) M= 110010101 and N= 0000101
(iv) M =101 and N = 110110
(v) M= 45 and N =90

4) Perform the multiplication of following numbers using two's complement method (i) 16 *-6
(ii) 23*-9
(iii) –12 *25
(iv) –12*-21
(v) –4 * -6

Assignment III (Week 4, 5):

1) Simplify the following Boolean functions to minimum number of literals

(i) AB+AB'+C'+ABC
(ii) ABC+ABC'+AB
(iii) AC+BC+ABC+BC'
(iv) ABC'+BC+AB
(v) ABC+ABCD+CD'+ABCD
(vi) AD + ABCD' +A'B'C'D' + ABC' + A'B'CD + ABC
(vii) A'CD + A'C'D' + A'B'C'D +ABC' +ABCD +A'B'C'D'

2) Simplify the problems of question no. 7 using karnaugh map.
3) Simplify the following functions using karnaugh map. (i) F=∑ (1,4, 7, 8)
(ii) F=∑ (3,4, 7)
(iii) F=∑ (0,1,2,4, 7, 8,10,15,)
(iv) F=∑ (1,4, 7, 8,10) and D=∑ (2,11,12)
(v) F=∑ (1,2,3,4,7,8,10,11,12) and D=∑ (6,9)
(vi) F=∑ (0,1,2,3,6,7,8,15) and D=∑ (13,14)
(vii) F=∑ (1,2,3,4,7,8,9,11,12,15)
(viii) F=∑ (1,4, 7, 8)

Assignment IV (week 6):

1) Implement the following function using AND and OR gate. (i) F=∑ (1,4, 7, 8)
(ii) F=∑ (3,4, 7)
(iii) F=∑ (0,1,2,4, 7, 8,10,15,)
(iv) F=∑ (1,4, 7, 8,10) and D=∑ (2,11,12)
(v) F=∑ (1,2,3,4,7,8,10,11,12) and D=∑ (6,9)

(vi) $F=\sum(0,1,2,3,6,7,8,15)$ and $D=\sum(13,14)$
(vii) $F=\sum(1,2,3,4,7,8,9,11,12,15)$
(viii) $F=\sum(1,4,7,8)$

2) Implement the following function using only NOR gate.
   (i) AB+AB'+C'+ABC
   (ii) ABC+ABC'+AB
   (iii) AC+BC+ABC+BC'
   (iv) ABC'+BC+AB
   (v) ABC+ABCD+CD'+ABCD
   (vi) AD + ABCD' +A'B'C'D' + ABC' + A'B'CD + ABC
   (vii) A'CD + A'C'D' + A'B'C'D +ABC' +ABCD
3) Implement the following function using only NOR gate.
   (i) AB+AB'+C'+ABC
   (ii) ABC+ABC'+AB
   (iii) AC+BC+ABC+BC'
   (iv) ABC'+BC+AB
   (v) ABC+ABCD+CD'+ABCD
   (vi) AD + ABCD' +A'B'C'D' + ABC' + A'B'CD + ABC

Assignment V:

1) Design a combinational circuit that accepts a three-bit number and generates an output binary number equal to the square of the input number.
2) Design a combinational circuit that accept BCD values and generate cube of That number.
3) Design a combinational circuit that generates 540321 weighted code for a BCD input.
4) Design a combinational circuit with four input lines that represent a decimal digit in BCD and four output lines that generate the 9's complement of the input number.
5) Implement a full subtractor with two half subtractor and one additional gate.
6) Design a combinational circuit that converts a BCD code to 8,4,-2,-1 code.
7) Design a excess 3 to BCD code converter using a four bit full adder MSI circuit.
8) Design a adder subtractor circuit using IC of full adder and some additional Gates.
9) Design a combinational circuit that accepts BCD input and multiply it by 3
10) Design a 4-bit circuit that generates booth multiplier for given multiplier.

Assignment VI:

1) A combinational circuit is defined by the following two functions.
   F1=x'y'+yz'
   F2=x'+y
   F3=xy+x'y'
   Design the circuit with a decoder and external gates.
2) Design an even parity generator.
3) Design 3 to 8 decoder by using two 2 to 4 decoder.

4) Design 4 to 16 decoder by using two 3 to 8 decoder.
5) Design 5 to 32 decoder by using four 3 to 8 decoder.
6) Implement the following function by using decoder and some external gates. a. $F(A,B,C) = \sum (1,4,5,7)$
   b. $F(A,B,C,D) = \sum (1,4,5,7,9,10)$
   c. $F(A,B,C) = \sum (1,4,5,6)$
   d. $F(A,B,C, D) = \sum (1,4,5,7,13,15)$
   e. $F(A,B,C,D,E) = \sum (1,4,5,7,8,9,12,14,16,17,27,30)$

Assignment VII:

1) Derive the excitation table of all flip-flops with their truth table.
2) Design an asynchronous UP counter.
3) Design a synchronous down counter.
4) Write the various application of asynchronous and synchronous transmission.

Assignment VII:

1) Write comparison between TTL and CMOS.
2) Write comparison between ECL and TTL.
3) Write various features of CMOS.
4) Write various features of TTL.
5) Write various features of ECL.

CS-2222: Data Structure and Algorithms
Lab Manual

1. Write a Program to construct stack of integers and to perform the following operations on it:
   a. Push
   b. Pop
   c. Display

   The program should print appropriate messages for stack overflow, stack underflow, and stack empty.

2. Write a Program to simulate the working of a queue of integers using an array. Provide the following operations:
   a. Insert
   b. Delete
   c. Display

3. Write a Program to simulate the working of a Circular queue and Deque of integers using an array. Provide the following operations:
   a. Insert
   b. Delete
   c. Display

4. Write a Program to construct a singly linked list and to perform the following operations on it:
   a) The insertion operation
      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   b) The deletion operation
      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   c) Displaying all the nodes in the list

5. Write a Program to construct a stack of integers using singly linked list and to perform the following operations:
   a. Push
   b. Pop
   c. Display

   The program should print appropriate messages for stack overflow and stack empty.

6. Write a program to construct a queue of integers using singly linked list and to perform the

following operations:

a. Insert

b. Delete

c. Display

7. Write a Program to construct a doubly linked list and to perform the following operations on it:

   a) The insertion operation

      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   b) The deletion operation

      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   c) Displaying all the nodes in the list

8. Write a Program to construct a Circular (Singly & Doubly) linked list and to perform the following operations on it:

   a) The insertion operation

      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   b) The deletion operation

      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list

   c) Displaying all the nodes in the list

9. Write a program to create and display a polynomial.

10. Write a program to print the middle element of a given linked list (There is an odd number of elements in list).

11. Write a program to Count the number of nodes of a given linked.

12. Write a program to Sort the element of linked list.

13. Write a program to Search a particular data in a singly linked list.

14. Write a Program:
    a. To construct a binary search tree of integers.
    b. To traverse the tree using all the methods i.e., inorder, preorder and postorder.
    c. To display the elements in the tree.

15. Implement Linear search algorithm.

16. Implement Binary search algorithm.

17. Implement Selection sort algorithm.

18. Implement Bubble sort algorithm.

19. Implement Quick sort algorithm.

20. Implement Insertion sort algorithm.

CS-3207: Object Oriented Programming through C++ I

Assignment 1:

Write and execute all the programs related to all the topics mentioned in the syllabus. Write these programs in assignment copy and submit. For reference download the file uploaded on Google classroom named CPP_Programs.zip.

Assignment 2:

Design and develop a project in C++ using the object oriented concepts. This will be a minor project that can be done in a team of 3 members. Project report and code must be submitted 15 days before final examination date.

SYLLABUS

Bachelor of Computer Applications

5th SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

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School of Computer Science & IT,
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Course Name BCA 5th Semester
Subject Code: CS -2302
Subject Name: SYSTEM ANALYSIS AND DESIGN

Aim of the Subject

to develop and maintain the system that perform basic business functions. The analysis and design are mainly base on understanding business objectives and processes.

Objectives

1 To design whole software, this fulfils all the requirements of customer.
2 To improve organizational systems, by applying software, this helps employees to perform business, tasks more effectively.
3 To determine specific needs of system.
4 To use appropriate methods and techniques to design software.

Learning Outcomes

- Understand the principles and tools of systems analysis and design
- Understand the application of computing in different context
- Understand the professional and ethical responsibilities of practicing the computer professional including understanding the need for quality.
- Solve a wide range of problems related to the analysis, design and construction of information systems.
- Be able to present projects
- Plan and undertake a major individual project, prepare and deliver coherent and structured verbal and written technical reports

Unit 1

Concept of System, Characteristics, Elements and Types of Systems, Transaction Processing System, Management Information System (MIS), Decision Support System. System Development Life Cycle, Waterfall Model, Prototyping Model, Spiral Model, I terative model CBD Model, Comparative Study of Various Development Models.

Unit 2

System Analysis, Role of System Analyst, Project Identification and Initiation, Feasibility Analysis, Project Selection, Creating Project Plan, Staffing the Project, Managing and Controlling the Project, Applying the concept to a case study.

Unit 3

Requirement Determination, Requirement Elicitation Techniques, Requirement Analysis Strategies, Process Modelling, Data Flow Diagram, User Interface

Design,Architectural Design, Design Process, Navigation Design, Input Design, Output Design, Applying the concepts to a case study

Unit 4

Implementation Phase, Managing the programming Process, Testing Fundamentals, Functional and Non Functional Testing, Black Box and White Box Testing Techniques, Testing Tools.Developing Documentation, Applying the concept to a case study.

Unit 5

Transition to a new system, The Migration Plan, Post implementation Activities.

Text Book(s)

1. System Analysis and Design: Awad, EM, Galgotia Publications Pvt. Ltd
2. Systems Analysis and Design: Dennis, Wixom, Roth, Wiley

Reference Material(s)

Silver and Silver, System Analysis and Design, Addison Wesley, Last Edition

Course Name BCA 5th Semester
Subject Code: CS-3604
Subject Name: Data and computer communication

Aim of the Subject

Build an understanding of the fundamental concepts of data communication and computer networking.

Objectives

1. Build an understanding of the fundamental concepts of data communication and computer networking.
2. Know about routing mechanisms and different routing protocols
3. Understand transport layer functions
4. Know about different application layer protocols

Learning Outcomes

1. Describe the basis and structure of an abstract layered protocol model
2. Independently understand basic computer network technology.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP.
5. Identify the different types of network devices and their functions within a network
6. Understand and building the skills of subnetting and routing mechanisms.

Unit 1

Data communications and networking for Today's Enterprise, A communication model, Data
Communications, Networking, and the Internet. Network model, need for a protocol architecture,
The TCP/IP protocol architecture, The OSI model, Addressing, Subnetting. Data transmission: Concept and
terminology, Analog and digital signals, Transmission impairment, Channel capacity

Unit 2

Digital transmission: Digital-to-digital conversion, Analog-to- digital conversion, Transmission mode. Analog transmission, Digital-to- analog conversion, Analog- to-digital conversion.

Unit 3

Bandwidth utilization: Frequency division multiplexing, Wavelength division multiplexing, Synchronous and statistical time-division multiplexing, Switching: Circuit switching Packet switching

Unit 4

Routing in switched network: Routing in packet switched networks, Least- cost algorithms. Local area network overview: Background topologies and Transmission media, LAN protocol architecture, Bridges, Ethernet.

Unit 5

Internet and transport protocols: Principles of internetworking IPv 4 & IPv 6 , Connection- oriented transport protocol mechanism, TCP and UDP. Network security: Encryption and decryption technique, Internet applications: E-mail, World Wide Web, And HTTP.

Text Book(s)

1. Data and Computer Communications: William Stallings, Prentice-Hall, 8th Ed.,
2. Data Communications and Networking, BehrouzA. Forouzan, McGraw- Hill, 5 th Edition.

Reference Material(s)

Course Name BCA 5th Semester
Subject Code: CS-2023
Subject Name: : Computer Organization and Hardware Maintenance

Aim of the Subject

This course will teach the fundamental of Computer Organization and Hardware Maintenance on the Application Binary Interfaces described in Course CS-2023.

Objectives

- To understand the basic hardware and software issues of computer organization To provide an overview on the design principles of digital computing systems.
- To understand the representation of data at machine level
- To understand how computations are performed at machine level
- To understand Computer hardware and Software Problem and their Troubleshooting

Learning Outcomes

- Ability to analyze the abstraction of various components of a computer
- Ability to analyze the hardware and software issues and the interfacing
- Ability to work out the tradeoffs involved in designing a modern computer system

Unit 1

Computer: Function, various Components, Architecture and Organization, Structure and function,.Interconnection Structures, PCI, Bus Interconnection., Computer Memory System: registers,Cache memory Principles, Elements of Cache Design, Pentium 4 and power PC organization, Semiconductor Main Memory, DRAM, SRAM, Types of ROM, SRAM and DRAM, Error Correction, Advanced DRAM Organization, Magnetic, Disk, RAID, Optical Memory, CompactDisk, Digital Versatile Disk, Magnetic Tape.

Unit 2

Input/output Techniques: Direct Memory Access, Intel 8237A DMA Controller, I/O Channels and Processors. Types of Interfaces. Interrupt- Driven I/O, Interrupt Processing, Intel 82C59 Interrupt Controller, External Devices, Keyboard, Monitor, I/O Modules, I/O module Structure,Programmed I/O, I/O Commands, The Arithmetic and Logic Unit:, Integer Representation,Integer Arithmetic, Floating Point Representation.

Unit 3

Instruction characteristics: Types of Operands, Types of Operations. Addressing modes, Instruction Formats, Example for Pentium and Power PCs, Machine Instruction Characteristics, Instruction Representation, and Instruction set Design. Processor Organization, Register Organization, Instruction Cycle, Instruction Pipelining, Introduction to Reduced Instruction set Architecture, Complex Instruction Set Architecture, and RISC versus CISC.

Unit 4

Hardware Basics: Basic terms, concepts, and functions of system modules (System board,firmware, storage devices, monitor, boot process, ports). CMOS and BIOS, POST sequence, Clock Generator, Bus controller ,CPU Cabinet: Power supply, SMPS, Chipsets , Motherboard, CPU structure, Cables and connectors, Front and rear panel study, Storage device, Input devices, Output devices(CRT, LCD/ LED), Display adapter cards, VGA and super VGA, Printer:, Sound devices (Speaker, Headphone, Bluetooth, dongle)

Unit 5

Interfaces: HDC, CRT Controller, Serial and Parallel, SCSI, IDE, SATA, ATA, UART, RS-232 , RJ-45 , Wifi, HDMI, USB, Mini USB, Micro USB, Driver Installation. Troubleshooting Procedures and Preventative Maintenance: Identifying Troubleshooting Tools, Hardware tools, Diagnostic software, The Art of Troubleshooting, Troubleshooting basics, troubleshooting by visual Inspection, Preventative Maintenance, Using Preventative Maintenance Tools, Materials and equipment, Software utilities,Maintaining Environmental, Controls, Ventilation and airflow, Humidity and liquids , Dirt and dust EMI, Power, UPS, and suppressors, Completing Maintenance Tasks, Case and components, Power supplies.

Text Book(s)

1.Computer Organization and Architecture (Ninth Edition) Pearson Education: William Stallings
2. . IBM PC & Clones: Hardware Trouble Shooting and Maintenance by B.Govindarajalu, Tata McGraw Hill

Reference Material(s)

1.Computer Architecture & Parallel Processing, Hwang & Briggs, McGraw Hill
2. . Computer Architecture By Dr. Rajkamal. Publication: TMH Indian Special edition2006.
3. Digital systems principal and Design by Dr. Rajkamal
4. CompTIA A+ Certification All-in-One Desk Reference for Dummies by Glen Clarke
5. PC Systems, Installation and Maintenance, Second Edition by R. P. Beales,

Course Name BCA 5th Semester
Subject Code: CS-2402
Subject Name: Introduction to DBMS (SQL& PLSQL)

Aim of the Subject

The student should learn database design and information retrieval concepts and apply these concepts in complex projects involving large database.

Objectives

To present necessary concepts for database designing.

1.Design conceptual, logical database model and physical model. Evaluate set of query using SQL and algebra.

Concepts of RDBMS, and learn Object oriented modelling. To introduce PL/SQL.

To introduce storage structure and file management.

2.Briefly describe any course development objectives that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field).

The course is focused on to increase the design skills of students for database technology, it is expected that student will use extensively the internet in discovering new tools and implement database applications.

Learning Outcomes

1. Introduction provides the general overview of the nature and purpose of database systems. We explain how the concept of the database systems. We explain how the concept of database system has developed, what the common features of the database system are, what the database system does for the user, and how a database system interfaces with operating systems.
2. Database design provides the overview of the database-design process, with major emphasis on the database design using the entity relationship data model. Entity relationship data model provides a high level view of the issues in database design.
3. . Relation database introduces the relational model of data, covering basic concepts as well as the relational algebra. A brief introduction to integrity constraints and focus on the most influential of the user- oriented relational languages: SQL.
4. . SQL provide how to interface between a programming language and the database supporting SQL.
5. Introduction to the theory of relational database design. The theory of functional dependencies and normalization is covered, with emphasis on the motivation and intuitive understanding of each normal form. An overview of relational design and relies on an intuitive understanding of logical implication of functional dependencies. This allows the concept of

normalization to be introduced prior to full coverage of functional dependency theory.

Unit 1

Introduction: purpose of DBMS, view of data, data models: physical model, logical model, conceptual model, hierarchical model, network model. Object oriented model. Database language, Database administrator, database user, overall system structure.

Unit 2

Entity relationship model: basic concepts, mapping constraints, keys, E-R diagram, weak, entity features, design of an E-R database schema, reduction of E-R schema to table.

Unit 3

Structured Query Language(SQL):basic structure, set operations, aggregate functions, null values, nested sub queries, data definition language(DDL), data manipulation language(DML), data control language(DCL), transaction control language(TCL),QBE,QUEL.

Unit 4

Relational database design: pitfalls in relational database design, decomposition, normalization using functional dependencies, normalization using multivalue dependencies, normalization using joined dependencies. Integrity constraints: domain constraints, entity integrity constraints, referential integrity constraints, assertion, triggers, functions, procedures, cursors.

Unit 5

Concept of RDBMS, characteristics of RDBMS, Codd's 12 rules, introduction to oracle tools, security.

Text Book(s)

1. Database system concepts by A.silberschatz, H.F.Korth, and S.Sudershan 5th Edition McGraw Hill

Reference Material(s)

1. An introduction to database management system by Vipin Desai
2. Modern database system by Mcfadden
3. SQL, PL/SQL The programming language of Oracle- Ivan Bayross

CS-2023: Computer Organization and Hardware Maintenance

Assignment(s)

1.Practice the shop floor processing of the concerned industry including safety precautions regarding operation of different tools and equipments, occupational hazards and safety measures related to the trade. Practice the environment management system to prevent environment pollution.

2. Prepare history Sheet of different tools and equipments.

3. Identify Processor chips and handling procedure. Identify I/O and memory chips on Microprocessor kit. Read and load memory locations. Practice assembly language programming. Carry out interfacing to microprocessors. Work on microcontroller, architecture, types and applications.

4. Identify the PC and its various vital components. List out various components of ROM and DOS software. Explain Embedded systems. Describe the AVR (Advantages, philosophy, architecture).

5. Identify ports of a PC. Practice to Connect and Disconnect the I/O devices to PC. Check system configuration and specifications. Check connectivity of devices. Identify IRQ and DMA settings. Modify IRQ settings. Identify device drivers and location. Disable/Uninstall and enable/install devices. Practice to Solder and De-Solder Measure voltage Different Circuits.

6. Install Keyboard. Set keyboard features. Clean keyboard. Identify defect in keyboards. Replace parts of keyboards. Troubleshoot defects. Install Mouse. Set properties of mouse. Clean Mouse. Identify defective Mouse. Replace parts of mouse and troubleshoot defects.

7. Install Printer. Set printer properties. Repair printer cable. Remove and replace ribbon/toner cartridge. Run Printer tools/utility. Practice maintenance of printers. Refill tape/toner.

8. Install CD Players and CD writers. Burn different types of CD using writer. Install DVD players and DVD writers. Install Combo drive and using writers. Troubleshoot and Repair CD and DVD.

9. Identify different types of motherboard form factors and specifications. Identify components on a motherboard. Identify different types of buses and raisers. Identify Processor, form factor and specifications. Identify jumpers on the motherboard and functions. Identify RAM slot, type, size, expandability. Identify CMOS capacity. Lithium battery.

10.Identify the type of HDD. Identify specification of HDD. Practice maintenance of HDD. Partition IDE/ATA Drives, SCSI drives. Format IDE/ATA drives, SCSI drives. Practice Jumper settings. Install and test Pen drives/Thumb drives. Test SMPS, Half wave, Full wave & Bridge rectifiers.

11. Repair and Maintain different makes and types of monitors.

12. List the features of micro controller boards. Configure ports and control their status, interrupts and timers. Compare Polling vs. Interrupt driven approaches.

13. Work with Laptop/notebook computers. Practice the disassembling and reassembling procedures. Replace processor. Replace memory. Replace add-in cards. Troubleshoot and repair/replace battery/mains adaptor.

14. List the features of micro controller boards. Configure ports and control their status, interrupts and timers. Compare Polling vs. Interrupt driven approaches.

15. Practice Supported communication protocols UART (RS-232) I2C SPI.

16. Explain Real time system concepts (OS vs. RTOS). Describe the need for an RTOS/scheduler. Identify RTOS components, Target RTOS.

17. Troubleshoot and rectify the faults of finished product. Work with the latest technology adapted in the industry at the time of training.

18. Install different device drivers Install different Application Software Practice to Run All Dos Command (Internal and External Dos Command) Practice taking Data Backup Install application Software : Photoshop 7.0, Page Maker 6.5, CorelDraw Install CD-DVD Burning Software like: Nero 7.0 & PowerISO 4.0 Install Tally 7.2 and Tally ERP 9.0 and Tack Data Backup Install and Troubleshoot Different types of Antivirus Software Install Dual Operating System like: Windows XP and Linux Install Dual Operating System using VMWare Run All Types of Network Troubleshooting Command.

CS -2302 SYSTEM ANALYSIS AND DESIGN

Assignments

Assignment-1

1. What is a system? Explain with example
2. What are characteristics of a system?
3. Which are the elements of a computer system? Explain it.
4. Define the System Concepts.
5. Explain prototyping method with its steps and uses.
6. What is system analyst? The roles of the System analyst.
7. Discuss Structured English with types and Example.
8. Explain feasibility study and cost benefit analysis.
9. List and Explain fact finding technique with its merits and demerits of each method.
10. Who is system analyst? Explain the role of system analyst in system development.
11. Which are the different methods for system development? Explain one of them.
12. Write a short note on system prototype method.
13. Explain feasibility study and cost-benefit analysis.

Assignment-2

1. Explain the benefits and weakness of code tools.
2. Why code is required? Explain four significant codes with suitable example.
3. Which are the basic principles of output design? When you design output which consideration you keep in mind.
4. Write the principals of code design.
5. What are the form design considerations?
6. What is data validation? Explain validation checks with example.
7. Explain basic steps for data capture.
8. Explain principals of input and output design.
9. What is code? Write down the type of code in detail.

Assignment-3

1. The difference between Logical DFD and Physical DFD.

2. What is DFD? List out the Symbol used in DFD.
3. Draw the Payroll System.

4. Draw the Inventory System.
5. Draw the Library System.
6. Draw the Finance Accounting System.
7 .What is a data dictionary?
8 .Why is a data dictionary necessary?
9. What are the main advantages of creating a data dictionary?
10. What data about a data element is stored?

SYLLABUS

M.B. A. (COMPUTER MANAGEMENT)

1st SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name MBA (CM) 1st Semester
Subject Code: CS-4121
Subject Name: Mathematical Foundation of Computer Science

Aim of the Subject

- To make students learn the fundamentals of mathematics and to develop the knowledge, skills and attitudes necessary in mathematics

Objectives

1.To develop abstract, logical and critical thinking and the ability to reflect logically while performing calculation in mathematics.

2.To form the base from which to explore concepts and develop problem-solving skills.

3.• To make students know and demonstrate understanding of the concepts from the branches of mathematics (number, algebra, geometry and trigonometry, probability, and discrete mathematics)

Learning Outcomes

Description of knowledge to be acquired:

A student completing course unit 1 should:

1. understand Sets and Membership .
2. perform operations on sets.
3. understand fundamental law of set operations.
4. perform Cartesian products on sets.
5. perform operations on functions.

A student completing course unit 2 should:

1. Algebra of Propositions
2. understand tautologies and contradictions
3. understand Truth Tables and Logically equivalent statements.

A student completing course unit 3 should:

1. understand Co-ordinate geometry of a point.
2. understand Co-ordinate geometry of straight line.
3. understand Co-ordinate geometry for triangle.
4. understand locus and its equation

A student completing course unit 4 should:

1. understand function .
2. understand differential and integral calculus.
3. understand basic laws of derivatives.

A student completing course unit 5 should:

1. understand progression .
2. annuity progression
3. present value of an annuity
4. depreciation by double declining balance method

Unit 1

Set Theory: Sets and Membership , subset and set equality, set operations, fundamental law of set operations. set construction. Cartesian products, Relations, Functions and Binary operations, operations on functions.

Unit 2

Algebra of Propositions: Statements, Conjunctions, Disjunctions, Negation, Conditional, Bi- conditional, Polynomials and Boolean polynomials. Propositions and Truth Tables, tautologies and contradictions, Logical equivalence, algebra of Propositions, Logical implication, Logically True and Logically equivalent statements.

Unit 3

Co-ordinate geometry of two dimensions, Co-ordinate of a point, Distance between two points, Point dividing the join of two points. Area of triangle, Locus and its equations. Transformation of co-ordinates.

Unit 4

Functions, limits and continuity- Functions, Constructions of Functions. Linear and quadratic Functions Sequences, Application to Management problems. Differential and integral calculus – derative, basic Laws of derivatives. Higher order derivatives. Maximum and Minima of functions of one variable. Integration by parts and simple method of integration of simple algebraic and transcendental functions.

Unit 5

Definite integral application to management problems including EOO model for Inventory control. progressions and annuity – Progressions. A.P. and G.P. Depreciation by double declining balance method. Present Value, Annuity, Present value of an annuity, Depreciation by sinking fund method. Present value under continues compounding.

Text Book(s)

J. K. Sharma, Mathematics for Business and Economics, Asian Books Pvt. Ltd., New Delhi

Reference Material(s)

Course Name MBA (CM) 1st Semester
Subject Code: CS-4022
Subject Name: Computer Organization and Assembly Language Programming

Aim of the Subject

This course covers the basics of computer organisation with emphasis on the lower level abstraction of a computer system including digital logic, instruction set and assembly language programming. Topics includes data representation, logic gates, simplifi

Objectives

To understand the structure, function and characteristics of computer systems.
1 To understand the design of the various functional units and components of computers.
1 To identify the elements of modern instructions sets and their impact on processor design.
1 To explain the function of each element of a memory hierarchy,
1 To identify and compare different methods for computer I/O.

Learning Outcomes

On completion of the course, student will be able to :
1 Demonstrate computer architecture concepts related to design of modern processors,
memories and I/Os.
1 Analyze the performance of commercially available computers.
1 To develop logic for assembly language programming

Unit 1

Computer Organization: Digital and Analog computers, Major components of a digital computer, Memory addressing capability of a CPU, Word length of a computer, Processing speed of a CPU, Definitions of Hardware, Software and Firmware. Definitions of Dumb, Smart and Intelligent terminals.
Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes: BCD code, Gray Code, ASCII code, Excess 3 Code, Error detecting Code.

Unit 2

Computer Arithmetic: Binary representation of Negative Integers using 2's complement and Signed magnitude representation, Fixed point Arithmetic operations on Positive and Signed (Negative) Integers like addition, subtraction, multiplication, Booth algorithm for multiplication,. Division of positive and negative binary numbers.

Unit 3

Introduction of 8085 Microprocessor: Architecture of 8085 processor. Register Architecture: Accumulator, Temporally Register and Flag Register. Program Counter, Stack pointer and Instruction register. Addressing Modes: Direct addressing mode and Register direct Addressing Mode. Register Indirect Addressing Mode, Immediate Addressing Mode and Implicit or Implied Addressing Mode.

Unit 4

Introduction to Assembly Language Programming: Various Instructions Classifications: Instruction Format, Opcode, Operand and Hex code. Instruction Operation Status, Various Instruction Sets: Data Transfer Group Instructions, Arithmetic Group Instructions, Logical Group Instruction, Branch Group Instructions: Conditional and Unconditional and Machine control Instructions.

Unit 5

Assembly language programming: Practice on assembly language programming, pinout diagram of 8085 microprocessor, interfacing of 8085 , interrupts, Direct memory access, introduction to 8086 microprocessor.

Text Book(s)

1. . Ramesh S. Gaonkar, Microprocessor Architecture, Programming and Applicationswith 8085/8080. Wiley Eastern Ltd. publication
2. B Ram, Computer Fundamentals: Architecture and Organization, New Age International, 2000
3. V. Rajaraman V and N. Adabala, Fundamentals of Computers, Prentice Hall India Learning Private Limited; 6th Revised edition edition

Reference Material(s)

1. R Theagarajan S Dhanasekaran and S Dhanapal, Microprocessor and Its applications, New Age International (P) Ltd.
2. Nicholas Carter and Raj Kamal, Computer Architecture and Organization, Schaum's Outlines Series
3. Dr. Raj kamal, Digital Systems: Principles and Design, Pearson Education

Course Name MBA (CM) 1st Semester
Subject Code: CS-5511
Subject Name: Operating Systems

Aim of the Subject

The course aims to explore the importance of the operating system and its function. The different techniques used by the operating system to achieve its goals as resource manager.

Objectives

1. To learn and understand the Concepts of operating system
2. To Learn and understand operating system services
3. The core structure, functions and design principles of operating system
4. Interposes communications and basic concepts of virtualization

Learning Outcomes

Students will be having understanding of following concepts of Operating System:

1. Process Management
2. Memory Management
3. File & I/O Management

Unit 1

Introduction: Evolution of operating systems, operating system concepts; activities, functions and services of operating system; Computer Systems: Mainframe, Desktop, Multiprocessors, Distributed, Clustered, Real time and Hand held systems. Computer System Operations, Storage hierarchy, Hardware protection, System calls, System structures. Process Management: Process concepts, Process scheduling, Operation on processes.

Unit 2

Cooperating processes, Inter- process communication. Threads: multithreading models, threading issues, thread examples. CPU Scheduling: concepts, scheduling criteria, scheduling algorithms, algorithm evaluation. Process synchronization: Critical section problem, Mutual exclusion and synchronization Techniques of inter process: Synchronization hardware, semaphore, classical problems of synchronization, critical regions and monitors. Deadlock: deadlock characterization, deadlock handling methods.

Unit 3

Memory Management: Concepts, single user memory management. Partition memory allocation: paging, segmentation and segmentation with paging, Virtual memory management: concept, demand paging, process creation, page replacement, allocation of frames and thrashing.

Unit 4

File Management: File concepts, access methods, directory structure, file system mounting, sharing and protection of files. File system structure and implementation, allocation methods, free space management, reliability of file system. Distributed file system and structures.

Unit 5

Device Management: Goals of input/output software design, Structure of device hardware and software. Layers of I/ O software, structure of device drivers, Disk driver, disk arm scheduling algorithms, terminal driver, clock driver, Case study of Windows 2000.

Text Book(s)

A. Silberschatz, P. Galvin and G. Gagne, Operating System Concepts, Addison Wesley, 8th Edition, 2008.

Reference Material(s)

William Stallings, Operating Systems: Internals and Design Principles 4 th Edition, Pearson Education, 2003.

Course Name MBA (CM) 1st Semester
Subject Code: CS-4205
Subject Name: Programming and Problem-SolvingUsing

Aim of the Subject

To learn the concept of programming and enable students to develop the logical skill to solve complex problems and handle projects

Objectives

1. .To develop programs to solve basic problems by implementing programming concepts like operators, control statements etc.
2. To select the right data representation formats based on the requirements of the problem.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
4. To write programs using the Dynamic Memory Allocation concept.
5. To create, read from and write to text and binary files.

Learning Outcomes

The students are expected to be able to:

1. Formulate the algorithms for simple problems.
2. Correct syntax errors as reported by the compilers.
3. Identify and correct logical errors encountered during execution.
4. Represent and manipulate data with arrays, strings and structures. use pointers of different types.
5. Create, read and write to and from simple text and binary files.
6. Modularize the code with functions so that they can be reused.

Unit 1

Introduction to Computer based Problem Solving; Algorithms and flowcharts; Programming Languages; Classification of Programming Languages; Characteristics of a program; Rules/ conventions of coding, documentation, naming convention; Structured Programming; Modular Programming; Programming Environment: Assembler, Interpreter, Compiler, Linker and Loader.

Unit 2

Fundamentals of C programming; History of C; Structure of C Program; Character set, Identifiers and Keywords; Data types; Constants and Variables; Operators and Expressions, Type Conversion, Operator Precedence and Associativity; Basic Input/Output operations; Decision control structures :if-else, switch-case ; Loop control structure : while, do-while, for; Jump statement : break ,continue ; goto statement.

Unit 3

Array: One dimensional array -Declaration, initialization of one dimensional arrays; Two dimensional array -Declaration, initialization of two dimensional arrays; multi-dimensional array. Strings: Declaring and initializing string, reading and writing strings, string manipulation functions, array of strings. Function: Need of user-defined function, Arguments, return value, return statement; passing parameters – call by value, call by reference; Scope, visibility and lifetime of variables; Nesting of functions; passing arrays to function; passing strings to function. Recursion: basics, comparison with iteration, types of recursion. Storage Classes.

Unit 4

Pointer: Declaring and initializing pointer variables, chain of pointers, Pointer expression, Pointer arithmetic, Array of pointer and its limitations; Pointers as Function arguments; Function returning pointer, Dynamic Memory management functions. Structure: Defining a Structure, Declaring & initializing Structure Variables, Membership Operator, Array in structure, Array of Structure, Structure within structure, Pointer to structure. Union: Defining union, Declaring & initializing union Variables; Bit Fields; Enumerated data type; typedef; Bitwise operators.

Unit 5

Command line arguments; File handling: Defining, opening and closing a file, input/output operations on file, merging files; C preprocessors: Macro substitution, file inclusion, compiler control directive.

Text Book(s)

1. Herbert Schildt, “C The Complete Reference”, Osborne/McGraw-Hill, 4 th Edition, 2000.
2. . Behrouz A. Forouzan and Richard F. Gilberg, “Computer Science: A Structured Programming Approach Using C”, Cengage Learning, 3rd Edition, 2007.

Reference Material(s)

1. B.W. Kernighan, D.M. Ritchie, “The C Programming Language”, Prentice Hall of India, 2nd Edition, 1988.
2. E Balagurusami, “Programming in ANSI C”, Tata McGraw-Hill, 6th Edition, 2012.
3. Byron S Gottfried, “Programming with C”, Tata McGraw-Hill, 3rd Edition, 2010.
4. Yashavant Kanetkar, “Let us C”, BPB Publications, 13th Edition, 2013.
5. Yashwant Kanetkar, “Test your C skills”, BPB Publication, 5th Edition, 2005.

Course Name MBA (CM) 1st Semester
Subject Code: IC-4916
Subject Name: Communication Skills and Report Writing

Aim of the Subject

To improve the confidence, communication skills and presentation capabilities of students that will help them in placements and corporate life.

Objectives

To develop effective communication skills in students which will help them in facing interviews and group discussions

Learning Outcomes

1. Improved skills in personal interviews and group discussions
2. Development of power of expression

Unit 1

Basics of Communication

Unit 2

Development of Group Discussion Skills

Unit 3

Development of Presentation Skills and facing interviews

Unit 4

Basics of Written Communication

Unit 5

Intense practice of Presentations, Group Discussions and Interviews

Text Book(s)

1. Communication – K. K. Sinha
2. Organizational Behavior - Fred Luthans
3. Organizational Behavior - Stephen Robbins

Reference Material(s)

1. Communications Skills – M.V. Rodrigues
2. Times of India/ Hindustan Times/ The Hindu etc.

Computer Organization and Assembly Language Programming

1. 8085 architecture
2. Instruction Set: Characteristics - Operand Types - Operation Types
3. Addressing Modes - instruction Formats
4. Addressing Modes (Simple Examples)
5. Assembly language programming
6. Computer Arithmetic: ALU -. Integer Representation and Arithmetic
7. Floating Point Representation and Arithmetic
8. CPU: Organization of Processors and Registers
9. Instruction Cycle - Instruction Pipelining
10. Register Optimisation - Architecture Pipelining. Instruction Set Architecture(ISA)
11. RISC and CISC, Compare RISC versus CISC
12. Characteristics of RISC, Large Register File
13. Characteristics of CISC, Instruction set complexity
14. Control Unit: Micro-Operations - Control of Processors
15. Explain how programs written in high-level languages are executed by a computer system.
16. Explain what hardware factors impact program performance and how to write programs for performance
17. Explain data representation, instruction sets, and addressing modes.
18. Write assembly language programs employing flow control constructs and procedures.
19. Explain techniques used by computer hardware designers to improve performance.
20. Explain how a data path can be implemented as a single-cycle or pipelined design.
21. Explain how the memory hierarchy impacts performance.
22. Explain the reasons for the ongoing transition to multiprocessor architectures.

CS-4121 Mathematical Foundation of Computer Science

MBA(CM)

Assignment: 01

Note :

Study the uploaded PDF and PPT that we had discussed earlier in class ,based on this study and prepare handwritten assignment in a copy.

Q1. Describe set theory and its types and also write basic operations on sets.
Q2. Proof commutative law, associative law, idempotent law by using union operation and intersection operation.
Q3. Proof Demorgan's law with an example.

CS-5511

Operating Systems

Lab Assignments

1. Implementation of FCFS (First Come First Serve) CPU Scheduling.
2. Implementation of SJF (Shortest Job First) CPU Scheduling.
3. Implementation of Round Robin (RR) CPU Scheduling.
4. Implementation of Priority CPU Scheduling Algorithm.
5. Implementation of FIFO Replacement Algorithm.
6. Implementation of Optimal Page Replacement Algorithm.
7. Implementation of LRU Page Replacement Algorithm by Stack method.
8. Implement the producer-consumer problem using threads.

SYLLABUS

M.B. A. (COMPUTER MANAGEMENT)

3rd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

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Course Name MBA (CM) 3rd Semester
Subject Code: CS-6518
Subject Name: Cloud Computing

Aim of the Subject

To provide students with the fundamentals and essentials of Cloud Computing, thus creating a sound foundation while enabling students to start using and adopting Cloud Computing services and tools in their real-life scenarios.

Objectives

1. Provide graduate students with the comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications by introducing and researching state-of-the-art in Cloud Computing fundamental issues, technologies, applications and implementations.
2. Expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.

Learning Outcomes

1. The fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges.
2. The basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations.
3. . Different CPU, memory and I/O virtualization techniques that serve in offering software, computation and storage services on the cloud.
4. Cloud storage technologies and relevant distributed file systems.

Unit 1

Introduction to cloud computing, History, Importance of cloud computing in the current era, characteristics of cloud computing, what cloud computing really is and isn't, pros and cons of cloud computing, technologies in cloud computing, migrating into cloud.

Unit 2

Types of clouds, cloud infrastructure, cloud application architecture, working of cloud computing, trends in cloud computing, cloud service models, cloud deployment models, cloud computing and services pros and cons.

Unit 3

Cloud computing technology, cloud life cycle model, role of cloud modelling and architecture, cloud system architecture, virtualization, types of virtualization,

importance and limitations of various types of virtualization, virtualization in cloud computing.

Unit 4

Data storage, introduction to enterprise data storage, data storage management, file system, cloud data stores, cloud storage characteristics, applications utilizing cloud storage.

Unit 5

Introduction to web services, cloud service deployment tools, management/ administrative services, risk management in cloud computing, introduction to Apache Hadoop.

Text Book(s)

1. Cloud Computing: A practical approach for learning and implementation, 1 st edition, Pearson, A. Srinivasan, J. Suresh.

Reference Material(s)

Online Material as and when required.

Course Name MBA (CM) 3rd Semester
Subject Code: CS- 4211
Subject Name: Object Oriented Programming Using JAVA

Aim of the Subject

To give students a good understanding of basic concepts of object-oriented program design using JAVA. To teach and enable students to develop object-oriented programming skills within the Java language; to enable students to develop object-oriented Java p

Objectives

Briefly describe any course development objectives that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

As the technologies in Java are changing frequently so with the textbook, latest changes will also be incorporated in the course using web-based material. Students will also be given programming examples and exercises on every topic. The programming assignments will be checked every week in the computer-lab

Learning Outcomes

- Understand basic principles of object- oriented program design using Java.
- Understand the basic and some advanced issues related to writing classes and methods Ill such as data, visibility, scope, method parameters, object references, and nested classes.
- Understand the basic ideas behind class hierarchies, polymorphism, and programming to interfaces.
- Get exposure to exceptions and basic I/O streams.
- Develop solid Java programming skills and the ability to put in practice the acquired knowledge and understanding of the Java language and object-oriented design in relatively simple case studies

Unit 1

Introduction to Java: Features of Java, Object-oriented Programming Overview, Introduction of Java Technologies, Java Applets and Applications, Java Platform, Java Program structure, Basic Building Blocks (comments, character set, constants), Data Types, Variables, Operators, Expressions, Typecasting, Control Structures, Loops, Memory concepts, Introduction to Class, Objects, Methods and Instance Variables, Naming Conventions, Constructors, Method Overloading, Static Method, Static Field, Math Class, this reference, Garbage collection and finalize method.

Unit 2

String Handling: The String Constructors, String Operations, Character Exaction, String Comparison, String Buffer. Arrays: Creating an array, Enhanced for Statement, Passing Multidimensional Arrays, Arrays to Method, Variable-Length Argument lists, Using Command- line Arguments. Wrapper Class : Introduction to wrapper classes. Inheritance: Relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses, The Object Class, Object Copying in Java. Polymorphism: Method Overriding, Upcasting, Dynamic Method Dispatch, final Field, Method and classes, Abstract classes and Methods, instance of operator, Downcasting, Class class, Runtime type Identification

Unit 3

Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, Creating own Packages. Defining an Interface, Properties of Interface, Advantages of Interface Achieving Multiple Inheritance through Interfaces, Variables in Interfaces, Comparable Interface. Exception Handling: Introduction, keywords, Types of Exceptions, Java Exception Hierarchy, finally Block, Chained Exceptions, Declaring new Exception Types, Preconditions and Post-conditions. Streams and Files: Introduction, Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream Class Hierarchy.

Unit 4

Multithreading: Introduction, Java Thread Model, Thread priorities, Thread l ife cycle, Creating Thread, Thread Execution, Thread Synchronization, Classes and Interfaces in java.util.concurrent, Monitor and Monitor Locks, Inter-Thread Communication. Introduction To GUI : Introduction, Overview of swing Components, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, Adapter Classes, Layout Managers Applets: Applet Basics, Applet Architecture, Applet Life Cycle Methods, Applet HTML Tag and Attributes, Executing Applet in Web Browser and in Appletviewer.

Unit 5

Generic and Collection API: Introduction, Motivation for Generic Methods, Generic Methods: Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance Database connectivity: JDBC, The design of JDBC, Executing Queries. New Feature of Java: Java Reflection API, Auto boxing, Annotations, Regular Expressions.

Text Book(s)

1 . Java 2 : The Complete Reference by Herbert Schildt, Tata Mc Graw- Hill, 8 th Edition,
2011.

Reference Material(s)

1. . The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rdEdition, Pearson Education, 2000.
2. Head First Java, Kathy Sierra, Bert Bates, O'Reilly Publication, 2nd Edition, 2005.

A New Subject Added in 2020-21 Session

Course Name MBA (CM) 3rd Semester
Subject Code: CS-5416
Subject Name: IT Infrastructure Management

Aim of the Subject

Develop skill for IT Infrastructure Management

Objectives

1 Understand IT Infrastructure and Management tools
2 Understand Servers Management
3 Understand Networking tools

Learning Outcomes

Setup IT Infrastructure for users

Unit 1

Understand H/w resources for network

Unit 2

Prepare IT Infrastructure

Unit 3

Developing Servers

Unit 4

Developing Application Servers

Unit 5

Understanding of Security Management

Text Book(s)

1. Inside the PC, Sixth Edition, Prentice Hall Computer Publications, author Peter Norton.
2. Data Communication and Networking, 2nd Edition, Tata McGraw-Hill , author Behrouz A, Forouzan

Reference Material(s)

1Microsoft Windows Server 2008: The Complete Reference. TataMcGraw-Hill, author Danielle Ruest,Nelson Ruest

MBA (CM) 3rd SEM Session 2020 - 2021

Course Name MBA (CM) 3rd Semester
Subject Code: CS-4411
Subject Name: Introduction to Enterprise Resource Planning

Aim of the Subject

To make students aware about the day to day terms used in ERP, CRM and HRM modules of ERP

Objectives

1. Learn what is ERP and its usage?
2. Learn what is CRM and where it is used?
3. Learn what is HRM and where it is used?
4. Important terms used in CRM/HRM Modules of any ERP?

Learning Outcomes

understand the analytics with examples to prepare data and information from data as an outcome
ERP, CRM and HRM module terms understanding

Unit 1

Introduction to ERP

Unit 2

Introduction to CRM

Unit 3

Introduction to HRM

Unit 4

CRM Terms

Unit 5

HRM Terms

Text Book(s)

1. ERP Next Documentation
2. A Guide to ERP by Pro. Dr. Lineke Sneller RC

Reference Material(s)

https://docs.erpnext.com/

A new Subject Added in 2020-21 Session

Course Name MBA (CM) 3rd Semester
Subject Code: CS-5620
Subject Name: Web Technology and E-Commerce

Aim of the Subject

This course focuses on principles of e- commerce from a business perspective, providing an overview of business and technology topics, business models, virtual value chains and social innovation and marketing strategies. In addition, some of the major issu

Objectives

1. On completion of this course, a student will be familiar with client server architecture and able to develop a web application.
2. Students will gain the skills and project-based experience needed for entry into web application and development careers.
3. Understand concept of Ecommerce and its types. Be familiarized with technologies for Ecommerce.
4. Understand different types of Online Payment systems. Understand Selling and marketing on web. Be familiarized with concept of E-business and E-business Models. Understand various E-business Strategies.

Learning Outcomes

1. . Describe the importance of IT enabled services and challenges Identifystrategic IT planning for software development.
2. Recognize enterprise IT architecture for Information technology. Illustrate various IT web services for betterment of knowledge.
3. Students use their skills to find out various current IT trends in ITES.
4. . Design a basic web site using HTML 5 and CSS 3 to demonstrate responsiveweb design.
5. Implement dynamic web pages with validation using JavaScript objects by applying different event handling mechanism.
6. Use AJAX Programming Technique for development.
7. Develop simple web application using server side PHP programming and Database Connectivity using MySQL.

Unit 1

HTML & Forms: Introduction To HTML, WWW, W3C, web publishing, Common HTML, Tags Physical & Logical, Some basic tags like changing background color of page, text color etc., Text formatting tags, Ordered & Unordered Lists Tags, Inserting image, Links: text, image links, image mapping , Tables , Frames, Form: Introduction with text box, text area, buttons, List box, radio, checkbox etc.

Unit 2

Internet Basics 1 Overview of Internet, history, web system architecture, Uniform Resource Locator, HTTP protocol basics, HTTP request & response, CSS: Introduction To Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning Use of classes in CSS, color properties, use of .

Unit 3

JavaScript: Introduction to script, types, Introduction of Java Script, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, AJAX introduction, implementation, applications.

Unit 4

Server configuration, JSP Basics: JSP lifecycle, Directives, scripting elements, standard actions, implicit objects. Concept of session, Starting session, Modifying session variables, Concept of cookies, Handling of cookies, GET and POST methods, database connectivity

Unit 5

Introduction to E- Commerce, The Anatomy of E-Commerce Applications, E Commerce Framework, E-Commerce Consumer Applications, E-Commerce organization Applications, Advantageous and disadvantageous of E-Commerce, Electronic Payment Systems: Types of Electronic payment Systems, Digital Token-Based Electronic Payment Systems, Smart Cards, Credit Card Based Electronic Payment Systems, EDI Application in Business, Security and Privacy Issues in EDI, Ethical, Social and Political issues in E-Commerce.

Text Book(s)

1. K. Mukhar, "Beginning Java EE 5: From Novice to Professional", Wrox Press.
2. . 1. Schafer, Steven M. Web standards programmer's reference: HTML, CSS,JavaScript, Perl, Python, and PHP. John Wiley & Sons, 2007.
3. 2.Batross, Ivan. Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Peril CGI. Bpb Publications, 2009.
4. Ravi Kalakota and Andrew B. Whinston, Frontiers of Electronic Commerce, First Edition, 2000.

Reference Material(s)

1. . M. Hall, L. Brown, "Core Servlets and Java Server Pages", 2nd edition, Pearson Education
2. Sebesta, Robert W. Programming the world wide web. Pearson Addison Wesley, 2008.

3. Glass, Michael K., et al. Beginning PHP, Apache, MySQL Web Development. John Wiley & Sons, 2004.
4. Powell, Thomas A. HTML: the complete reference. McGraw-Hill Professional, 2002.

SYLLABUS

Master of Computer Applications

1st SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name MCA 1st Semester
Subject Code: IC-4916
Subject Name: Communication Skills and Report Writing

Aim of the Subject

To improve the confidence, communication skills and presentation capabilities of students that will help them in placements and corporate life.

Objectives

To develop effective communication skills in students which will help them in facing interviews and group discussions

Learning Outcomes

1. Improved skills in personal interviews and group discussions
2. Development of power of expression

Unit 1

Basics of Communication

Unit 2

Development of Group Discussion Skills

Unit 3

Development of Presentation Skills and facing interviews

Unit 4

Basics of Written Communication

Unit 5

Intense practice of Presentations, Group Discussions and Interviews

Text Book(s)

1. Communication – K. K. Sinha
2. Organizational Behavior - Fred Luthans
3. Organizational Behavior - Stephen Robbins

Reference Material(s)

1. Communications Skills – M.V. Rodrigues
2. Times of India/ Hindustan Times/ The Hindu etc.

A new Subject Added in 2020-21 Session

Course Name MCA 1st Semester
Subject Code: CS-4122
Subject Name: Mathematical Foundation for Computer Application

Aim of the Subject

To develop logical and mathematical concepts commonly required in many areas of Computer Science.

Objectives

1. To be familiar with Propositions, Predicates and Set theory.
2. To provide the concept of Vector Spaces and Vector Subspaces those are mandatory in the area of Machine Learning.
3. . To be able to form a strong base of Mathematical Induction and Recurrence Relations, so as to implement them easily in algorithms.
4. To understand Functions and Relations and consequently, their importance in Computer Science.
5. To explore Probability and Statistical analysis that will help in various applications of Computer Science.

Learning Outcomes

-

Unit 1

Logics, Prepositions, Predicates and Quantifiers. Introduction to Set theory, Set Operations, Fuzzy Sets.
Introduction to Vector Spaces, General properties of Vector Spaces, Vector Subspaces.
Introduction to methods of Proof, Mathematical Induction, use of Mathematical Induction to solve different problems.

Unit 2

Functions, One-to-One Functions, Onto Functions, Inverse Function, Composition of Functions. Recurrence Relations, solving Recurrence Relations, Applications of Recurrence Relation. Basic understanding of Complexities, Complexity and analysis of various basic algorithms.

Unit 3

Relation, importance of Relations in Computer Science, properties and applications of Relations, Closures of Relations, Equivalence Relations, representing Relations, Relation matrix, Relation graph, Composite relation, Operations on relations- union, intersection and join.

Unit 4

Correlation, Coefficient of Correlation, Rank Correlation, Partial and Multiple Correlations. Regression, Regression Coefficient, Lines of Regression. Curve fitting, methods of Least Square for fitting different Curves.

Unit 5

Conditional Probability, Bayes' Rule, Discrete and Random variables. Discrete Probability Distributions- Binomial Distribution, Poisson Distribution, Uniform Distribution etc. Continuous Probability Distributions- Rectangular, Gaussian Distribution, Gamma Distribution, Beta Distribution etc.

Text Book(s)

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, McGraw-Hill Education, ISBN: 9780070681880, 0070681880
2. S.C. Gupta, V.K. Kapoor, "Fundamentals of Mathematical Statistics", 12th Edition, Sultan Chand & Sons, ISBN: 9789351611738, 9351611736
3. . David C. Lay, "Linear Algebra and Its Applications", Pearson Education Limited, 4th Edition, ISBN: 9781292020556, 1292020555

Reference Material(s)

1. Jay L. Devore, Kenneth N. Berk, "Modern Mathematical Statistics with Applications", 2nd Edition, Springer New York, ISBN: 9781461403913, 146140391X
2. Vijay K. Rohatgi, A. K. Md. Ehsanes Saleh, "An Introduction to Probability and Statistics", 3rd Edition, Wiley.
3. Seymour Lipschutz, Marc Lipson, "Schaum's Outline of Discrete Mathematics", 3rd Edition, McGraw-Hill Education, ISBN: 9780071511018, 0071511016
4. V. K. Balakrishnan, "Introductory Discrete Mathematics", Dover Publications, ISBN: 9780486140384, 0486140385.

Electronic Materials

- https://nptel.ac.in/courses/106/103/106103205/
- https://nptel.ac.in/courses/106/105/106105192/
- https://nptel.ac.in/courses/111/107/111107137/
- https://nptel.ac.in/courses/111/106/111106135/
- https://nptel.ac.in/courses/111/106/111106112/

Update curriculum in 2020-21 Session (earlier Object oriented Programming through C++ & Data structures were two different subjects in II semester when MCA was a 3 years Programme.

Course Name MCA 1st Semester
Subject Code: CS-4209
Subject Name: Data Structures using C++

Aim of the Subject

The aim of this course is to give you a feel for algorithms and data structures.student should end it appreciating that understanding the algorithm and data structures used for some problem is much more important than knowing the exact code for it in some

Objectives

The objectives are that student should know something of all of these by the end of the course. Student should be aware of algorithms and data structures: sorting and searching algorithms, categorizing efficiency in time and memory use, linked list and tree data structures, hash tables, stacks and queues. As well as knowing about them, student should be familiar enough with the concepts that should you need to take any of them further and make use of them, student will be able to do so.

Learning Outcomes

Student writes generalized code expressing an algorithm or data structure in a way that may be used in a variety of real-world situations. Come to know how to work out the efficiency of an algorithm, though we won't cover detailed formal analysis.

Unit 1

Introduction to Data Structure: Concepts of Data and Information, Classification of Data structures, Abstract Data Types, Data structures operations. Algorithms, Algorithm complexity notations like big Oh, Theta, and Omega. Time Complexity, Big –Oh -notation, Running Times, Best Case, Worst Case, Average Case, Factors depends on running time. Implementation aspects: Memory representation. Static and Dynamic implementations. Examples and real life applications, Data Structures: Arrays, Address calculation in a single and multi dimensional array, Sparse Matrices, Pointer & Structure.

Unit 2

Stacks, Queues and Lists Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples : Infix, postfix, prefix representation, Applications : Mathematical expression Evaluation Definition: Queues & Lists: Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and Singly linked Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority queues , Applications.

Unit 3

Trees & Graphs Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal; pre-order, post-order, in-order traversal, Binary Search Trees, Implementations, Threaded trees, AVL Trees, Implementations , Balanced multi way search trees, Applications Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, path matrix implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal –Breadth f irst Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Applications.

Unit 4

Introduction to Recursion, Divide and Conquer Algorithm, Evaluating time Complexity. Straight Sequential Search, Binary Search, non –recursive Algorithms, recursive Algorithms, Indexed Sequential Search. Definition, Hash function, Collision Resolution Techniques, Hashing Applications.

Unit 5

Sorting Algorithms Introduction, Sorting by exchange, selection, insertions, Bubble sort, Selection sort, Insertion sort, Efficiency of algorithms, Shell sort, Performance of shell sort, Merge sort, Merging of sorted arrays, The merge sort Algorithms, Quick sort Algorithm, Analysis of Quick sort, Picking a Pivot, A partitioning strategy, Heap sort, Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach, Radix sort.

Text Book(s)

1.Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub, 6th Edition.
2..How to Program C++ by Paul Deitel , Harvey Deitel, Prentice Hall; 8 edition.

Reference Material(s)

1..Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum'soutline by TMH 2006,Special Indian Edition.
2. Data Structures and Algorithms by A. V. Aho, J . E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
3. Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983, AW, 1st Edition.
4. Data Structures and Program Design in C By Robert Kruse, PHI, 2nd Edition.

Course Name MCA 1st Semester
Subject Code: CS- 5511
Subject Name: OPERATING SYSTEMS

Aim of the Subject

• general understanding of structure of modern computers purpose, • structure and functions of operating systems • Illustration of key OS aspects by example

Objectives

1. To provide opportunity for the study of modern methods of information processing and its applications;
2. To acquaint students with knowledge of the computer systems with emphasis on their uses and limitation;
3. To develop among students the programming techniques and the problem solving skills through programming;
4. To foster among students an interest and confidence in using computers;
5. To encourage an understanding of the implications of computers in the modern world;
6. . To prepare students who wish to go on to further studies in computerscience and related subjects.

Learning Outcomes

By the end of the course student should be able to describe the general architecture of computers describe, contrast and compare differing structures for operating systems understand and analyze theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files.

Unit 1

Introduction: Evolution of operating systems, operating system concepts; activities, functions and services of operating system; Computer Systems: Mainframe, Desktop, Multiprocessors, Distributed, Clustered, Real time and Hand held systems. Computer System Operations, Storage hierarchy, Hardware protection, System calls, System structures. Process Management: Process concepts, Process scheduling, Operation on processes.

Unit 2

Cooperating processes, Inter- process communication. Threads: multithreading models, threading issues, thread examples. CPU Scheduling: concepts, scheduling criteria, scheduling algorithms, algorithm evaluation. Process synchronization: Critical section problem, Mutual exclusion and synchronization Techniques of inter process: Synchronization hardware, semaphore, classical problems of

synchronization, critical regions and monitors. Deadlock: deadlock characterization, deadlock handling methods.

Unit 3

Memory Management: Concepts, single user memory management. Partition memory allocation: paging, segmentation and segmentation with paging, Virtual memory management: concept, demand paging, process creation, page replacement, allocation of frames and thrashing.

Unit 4

File Management: File concepts, access methods, directory structure, file system mounting, sharing and protection of files. File system structure and implementation, allocation methods, free space management, reliability of file system. Unix file system.

Unit 5

Device Management: Goals of input/output software design, Structure of device hardware and software. Layers of I/ O software, structure of device drivers, Disk driver, disk arm scheduling algorithms, terminal driver, clock driver etc.

Text Book(s)

1. A. Silberschatz, P. Galvin and Gagne, Operating System Concepts, Addison Wesley, 6th Edition, 1994.

Reference Material(s)

1. Operating systems, 4rth Edition, William Stallings, Pearson Education, 2003.

Course Name MCA 1st Semester
Subject Code: CS-4009
Subject Name: Computer Organization and Architecture

Updated curriculum in 2020-21 Session as per 2 years MCA programme requirements

Aim of the Subject

This course aims to give an understanding of the basic computer architecture, leading to strong foundation of assembly language, operating system, compilation process, performance aspects of software, IOT & Cloud Computing.

Objectives

- To develop understanding of core concepts of computer architecture from instruction execution viewpoint & memory interaction leading to basics of assembly language programming
- To develop understanding of different architectural styles, pipelining, various memory technologies
- To build foundation of IOT & Cloud basics from architecture point of view

Learning Outcomes

1. Students should understand the computer architecture, CPU-memory interaction, instruction execution process through assembly language of 8088 microprocessor.
2. Students should be able to understand different CPU Architectures like instruction pipelines, RISC/CISC, Cache memory, placement/replacement policies, cache coherence issues, memory technologies.
3. Students should be able to learn the basic concepts of IOT & Cloud so as to build strong foun-dation of these subjects from computer architecture point of view

Unit 1

Computer Organization: Digital and Analog computers, Major components of a digital computer, Memory addressing capability of a CPU, Word length of a computer, Processing speed of a CPU. Technological trends. Von Neumann model, Functional units and components in computer organization: The memory unit, the input and output subsystem, the bus structures, design of ALU in context of 8088 microprocessor.

Unit 2

Introduction to 8088 Microprocessor: Architecture, Register Architecture: Accumulator, GPR, PC, IR, SP and Flag Register. Various instruction classification: Instruction Format, Opcode, Operand and Hex code. Addressing modes, Introduction to Assembly Language Programming: Instruction Operation Status, Various Instruction Sets: Data Transfer Group Instructions, Arithmetic Group

Instructions, Logical Group Instruction, Branch Group Instructions: Conditional and Unconditional and Machine control Instructions, interrupts, Direct memory access.

Unit 3

Micro-Operations, Functional Requirements, Processor Control, Hardwired Implementation, Micro-programmed Control, Introduction to RISC and CISC Architecture, Instruction pipelining: Instruction pipelining hazards, data dependency hazards and control hazards, overcoming hazards. Internal Memory: RAM, SRAM and DRAM, Interleaved and Associative Memory, Cache Memory: Data caches, instruction caches and unified caches, cache implementations, fully associative and direct mapped caches, write back versus write through caches.

Unit 4

Understanding IoT fundamentals, IoT architectures and protocols, Working of sensors and actuators, , Sensor Networks, Machine-to-Machine Communications, Interfacing with Arduino, Raspberry Pi, NVIDIA Jetson Nano (GPU) etc., Cloud platform for IoT, IoT Applications.

Unit 5

Grid Computing : data and computational grids, Grid architecture and its relations to various distributed technologies, Cloud computing : Evolution of cloud computing, Comparison with traditional computing architecture (client/server), Services provided at various levels, Parallel Computing : Flynn's Classification of Computer Architecture, Types of Parallelism, Parallel programming models.

Text Book(s)

1. Computer System Architecture, M. Morris Mano, Pearson Education.
2. Computer Organization & Architecture, William Stallings, 8e, Pearson Education.
3. Microprocessor Architecture, Programming and Applications with 8085/8080 by Ramesh S. Gaonkar.
4. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, " From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
5. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
6. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed System: Principles & Paradigms, Prentice Hall, 2007.

Reference Material(s)

Online Material will be provided as and when required.

SYLLABUS

Master of Computer Applications

3rd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

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Course Name MCA 3rd Semester
Subject Code: CS 5123
Subject Name: Theory of Computation

Aim of the Subject

The theory of computation is the branch of computer science that deals with whether and how efficiently problems can be solved on a computer. In order to perform a rigorous study of computation, computer scientist's work with mathematical abstractions of

Objectives

1. Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
2. Enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

Learning Outcomes

Upon successful completion of this course, you will be able to

1. Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
2. explain the models of computation, including formal languages, grammars and automata, and their connections.
3. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
4. Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

Unit 1

Theory of Automata: String, Alphabet and Languages, Finite Automata, Finite State machine, Basic Definition. Description of a Finite Automaton, Deterministic Finite Accepters Transition Graphs, Languages, Non-deterministic Finite Acceptors-Definition, Finite Automata with ϵ-moves, Equivalence of Deterministic and Non-deterministic Finite Accepters, Conversion of NDFA to DFA, Removal of ϵ transition from ϵ – NDFA, Minimization of Finite Automata – Definition and Construction. Mealy and Moore models Definitions, Transformation of Mealy Machine into Moore Machine and vice-versa.

Unit 2

Properties of Regular Sets: Pumping lemma for regular set, Closure properties of regular set. Formal Language: Basic Definition, Chomsky Classification of languages, Initialization of Finite Automata Regular Expression and Language Regular Expressions, Connection between Regular Expressions and Regular Languages.

Unit 3

Regular Grammars – Right and Left Linear Grammars, Equivalence between Regular Languages and Regular Grammars. Context-Free Grammars: Leftmost and Rightmost Derivations, Derivation Trees, Parsing and Ambiguity, Simplification of CFGs. Chomsky Normal Form, Greibach Normal Form, Cocke-Kasami- Younger Algorithm, Properties of Context-Free Languages.

Unit 4

Pushdown Automata: Definition, Non-deterministic Pushdown Automata, Pushdown Automata for Context Free Languages Context-Free Grammars for Pushdown Automata. Deterministic Pushdown Automata and Deterministic Context-Free Languages.

Unit 5

Turing Machine: Definition of Standard Turing Machine, Turing Machine as Language Accepters and Transducers.

Text Book(s)

1. Mishra and Chandrasekaran, Theory of Computer Science (Automata, language and Computation), 2nd Ed. Prentice Hall of India.
2. J. E. Hopcroft, R. Motwani and J.D Ullman, Introduction to Theory, Languages and Computation; Second Edition, Addison-Wesley, 2001 Narosa Publishing House.

Reference Material(s)

1. Moll, Arbib and Kfoury, an Introduction to Formal Language Theory, Springer-Verlag.
2. Martin, J .C.: Introduction to Languages and the Theory of Computation, McGraw-Hill, Inc.,3rd ed., 2002. ISBN 0-072-32200-4.
3. . Brookshear, J.G.: Theory of Computation: Formal Languages, Automata, andComplexity, Benjamin/Cummings Publishing Company, Inc, Redwood City, California, 1989. ISBN 0-805-30143-7.
4. Peter Linz, An Introduction to Formal Languages and Automata, Narosa

Course Name MCA 3rd Semester
Subject Code: IC-4917
Subject Name: Accounting and Financial System

Aim of the Subject

Development of understanding of basic concepts of Accounting

Objectives

To enable students to work in the Financial Domains required in corporate sector to perform effectively as technical experts

Learning Outcomes

Students learn to prepare Balance Sheets and Operate on Tally Software

Unit 1

Development of Basic Principles and rules of Accounting

Unit 2

Understanding of the Process of Accounting – Journal, Ledger, Subsidiary books, trial balance etc.

Unit 3

Learning of Financial Systems

Unit 4

Tools of Financial Analysis and Break Even Analysis

Unit 5

Responsibility Accounting and Tally

Text Book(s)

1. Tulsian's Accountancy for Class XI
2. Financial Management by Khan & Jain

Reference Material(s)

1. Financial Accounting by T.S. Grewal.
2. NCERT Books on Accounting and Financial Management for Class XI and XII.

Course Name MCA 3rd Semester
Subject Code: CS 5613
Subject Name: Computer Network

Aim of the Subject

As a result of rapid technological progress, the old model of a single computer serving all the organization's computational needs has been replaced by a large number of separate but interconnected computers.

Objectives

1. . Develop knowledge of the function of both hardware (basics) and software aspects of computer network systems.
2. Understand the fundamental principles of various networking architectures and their protocols.
3. Gain an understanding of the principles of operation of a wide variety of network technologies.
4. Develop an appreciation of how network services are developed and knowledge of their uses.
5. Apply knowledge of computers, software, networking technologies, and information assurance to an organization's management, operations, and requirements.
6. Prepare to continue their studies to obtain various industry certifications.
7. Computer networks is a rapidly evolving field, with new standards and improvements in data communication technology occurring, for this included the topics of CSMA/CA, wireless LANs, IPv6, new developments in application layer protocols etc.

Learning Outcomes

1. Familiarity with network terminologies, reference model, applications of network, design issues and how computer network works?
2. Knowledge of Data link layer design issues, Framing, Error correction and Detection techniques.
3. Meaning of flow control and its methods.
4. Problems associated with broadcast network and multiple access control protocols.
5. Knowledge of IEEE 802.3, 802.4 and 802.5, 802.11
6. Latest LAN examples.
7. Design issues related to Network layer like routing, addressing and their protocols.
8. Introductory knowledge of Transport layer protocols like TCP and UDP.
9. Idea about client server architecture and working of DNS, HTTP and E Mail.

10. Security issues in computer network and Introduction to Cryptographic algorithms and Digital Signature.

Unit 1

Introduction - Computer Network, Goals and Applications; Network Classification: Broadcast & point-to-point networks, LAN, MAN & WAN networks; protocol hierarchies; design issues for the layers. Connection Oriented and Connection less services, Service primitives, Relationship between Services and Protocols; Switching Techniques – Circuit Switching and Packet Switching; Reference models – OSI and TCP/IP, comparison and critique of OSI and TCP/IP reference models, Internet Concept.

Unit 2

Data Link Layer: Design issues – Services, Framing, Error Control and Flow Control; Error Detection Techniques - Parity Check and Cyclic Redundancy Check (CRC); Error Correction Technique - Hamming code; Elementary Data Link Protocols - Unrestricted Simplex Protocol, Simplex Stop-and- Wait Protocol, Sliding Window Protocols: One-Bit Sliding Window Protocol, protocol using Go Back N and Selective Repeat; HDLC protocol; Data link layer in the Internet - SLIP and PPP.

Unit 3

MAC Sublayer - Multiple access protocols: Aloha, CSMA Protocols; Collision-Free Protocols, IEEE MAC Sublayer protocols : Ethernet cabling, 802 .3 protocol, 802.4 MAC sublayer protocol, 802.5 MAC sublayer protocol and their management. High speed LANs : Fast Ethernet, FDDI; Wireless LANs; Bluetooth; data link layer switching- Bridges and Switches, their difference with Repeaters, Hubs, Routers and Gateways.

Unit 4

Network Layer - Design issues; Routing Principles; Routing Algorithms: Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing. Link State Routing, Hierarchical Routing, Broadcasting Routing, Multicast Routing; The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols.

Unit 5

Transport Layer - The transport Services; The Internet Transport Protocols: UDP and TCP; The TCP Service Model. Application layer - Client Server Architecture; DNS; WWW and HTTP; Proxy Server; E- mail Protocols; FTP; TELNET. Network Security - Cryptography, Symmetric- key Algorithms, Public- key Algorithms; Digital Signatures

Text Book(s)

Computer Networks, Andrew S. Tanenbaum, Pearson Education, 5th Edition.

Reference Material(s)

1. Data Communications and Networking, B.A. Forouzan, McGraw-Hill, 5th Edition.
2.Computer Networking : James F. Kurose & Keith W. Rose , Pearson Education, Third Edition, 2005.
3.Communication Networks : Fundamentals Concepts and Key Architecture : Alberto Leon-Garcia and Indra Widjaja, , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235-3.
4. Data and Network Communication : Michael A. Miller, Delmar Thomson Learning inc. ISBN 0-07668-1100-X.
5. Introduction to Computer Networks : Douglas E. Comer , Prentice-Hall.
6. Alberto Leon-Garcia and Indra Widjaja, Communication Networks –Fundamentals Concepts and Key Architecture , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235-3.
7.Data and Computer Communications : W.Stallings, , Prentice-Hall, 5th Ed., 1997.

Course Name MCA 3rd Semester
Subject Code: CS- 4211
Subject Name: Object Oriented Programming Using JAVA

Aim of the Subject

To give students a good understanding of basic concepts of object-oriented program design using JAVA. To teach and enable students to develop object-oriented programming skills within the Java language; to enable students to develop object-oriented Java p

Objectives

Briefly describe any course development objectives that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

As the technologies in Java are changing frequently so with the textbook, latest changes will also be incorporated in the course using web-based material. Students will also be given programming examples and exercises on every topic. The programming assignments will be checked every week in the computer-lab

Learning Outcomes

- Understand basic principles of object- oriented program design using Java.
- Understand the basic and some advanced issues related to writing classes and methods Ill such as data, visibility, scope, method parameters, object references, and nested classes.
- Understand the basic ideas behind class hierarchies, polymorphism, and programming to interfaces.
- Get exposure to exceptions and basic I/O streams.
- Develop solid Java programming skills and the ability to put in practice the acquired knowledge and understanding of the Java language and object-oriented design in relatively simple case studies

Unit 1

Introduction to Java: Features of Java, Object-oriented Programming Overview, Introduction of Java Technologies, Java Applets and Applications, Java Platform, Java Program structure, Basic Building Blocks (comments, character set, constants), Data Types, Variables, Operators, Expressions, Typecasting, Control Structures, Loops, Memory concepts, Introduction to Class, Objects, Methods and Instance Variables, Naming Conventions, Constructors, Method Overloading, Static Method, Static Field, Math Class, this reference, Garbage collection and finalize method.

Unit 2

String Handling: The String Constructors, String Operations, Character Exaction, String Comparison, String Buffer. Arrays: Creating an array, Enhanced for Statement, Passing Multidimensional Arrays, Arrays to Method, Variable-Length Argument lists, Using Command- line Arguments. Wrapper Class : Introduction to wrapper classes. Inheritance: Relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses, The Object Class, Object Copying in Java. Polymorphism: Method Overriding, Upcasting, Dynamic Method Dispatch, final Field, Method and classes, Abstract classes and Methods, instance of operator, Downcasting, Class class, Runtime type Identification

Unit 3

Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, Creating own Packages. Defining an Interface, Properties of Interface, Advantages of Interface Achieving Multiple Inheritance through Interfaces, Variables in Interfaces, Comparable Interface. Exception Handling: Introduction, keywords, Types of Exceptions, Java Exception Hierarchy, finally Block, Chained Exceptions, Declaring new Exception Types, Preconditions and Post-conditions. Streams and Files: Introduction, Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream Class Hierarchy.

Unit 4

Multithreading: Introduction, Java Thread Model, Thread priorities, Thread l ife cycle, Creating Thread, Thread Execution, Thread Synchronization, Classes and Interfaces in java.util.concurrent, Monitor and Monitor Locks, Inter-Thread Communication. Introduction To GUI : Introduction, Overview of swing Components, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, Adapter Classes, Layout Managers Applets: Applet Basics, Applet Architecture, Applet Life Cycle Methods, Applet HTML Tag and Attributes, Executing Applet in Web Browser and in Appletviewer.

Unit 5

Generic and Collection API: Introduction, Motivation for Generic Methods, Generic Methods: Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance Database connectivity: JDBC, The design of JDBC, Executing Queries. New Feature of Java: Java Reflection API, Auto boxing, Annotations, Regular Expressions.

Text Book(s)

1 . Java 2 : The Complete Reference by Herbert Schildt, Tata Mc Graw- Hill, 8 th Edition,
2011.

Reference Material(s)

1. . The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rdEdition, Pearson Education, 2000.
2. Head First Java, Kathy Sierra, Bert Bates, O'Reilly Publication, 2nd Edition, 2005.

Course Name MCA 3rd Semester
Subject Code: CS-4408
Subject Name: Database Applications and Tools

Aim of the Subject

To present students with database designing and database project management, with an emphasis on how to approach, organize, maintain and retrieve - efficiently, and effectively - information from a DBMS and at the same time enabling students with an insig

Objectives

1. Understand the role of a database management system in an organization.
2. Understand basic database concepts, including the structure and operation of the relational data model.
3. Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.
4. Design and implement a small database project using Project Management Tools.
5. Understanding the organizational approach towards any project using Information Technology Project Management concepts.
6. Describe and discuss selected advanced database topics, such as distributed database systems and the data warehouse.

Learning Outcomes

1. Describe the fundamental elements of relational database management systems
2. . Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
3. Design ER-models to represent simple database application scenarios.
4. Understand the concept and elements of project management.
5. . Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
6. Improve the database design by normalization.

Unit 1

Database Environment: Data versus information, traditional f i le processing, disadvantages, database approach, range of database application, advantages of database approach. Cost and risk factors, components of database environment, evolution of database system.
Database Development Process: Information engineering, information architecture, enterprise data model, planning, SDLC, CASE etc. Steps of planning, strategic

planning factors, corporate planning objects. Developing preliminary data model, and use of planning matrices, SDLC steps, CASE role, people in database development, three-schema architecture for database development. Examples to demonstrate the development process.

Unit 2

Modeling Data in the Organization: Modeling of the rules of organization, data names and definitions, ER model constructs entities and its types, attributes, relationships, degree, unary, binary, ternary, n-ary, cardinalities constraints, ER modeling examples.Project Management: Introduction to Information Technology Project Management. Integration Management, Triple Constraint, Scope, Time and Cost Management.

Unit 3

Enhanced ER modeling: supertype, subtypes, specialization, generalization, specifying constraints in EER models, completeness, Disjointness, discriminators, defining super/sub type hierarchies, EER modeling examples, live demos modelling for few scenarios.

Unit 4

Logical database design: and relational model development, Relational model properties, keys, primary, secondary, composite, properties of relations. Codd' s rules, integrity constraints, creating relational tables, Transform EER diagrams into relations, seven different steps for mapping EER model into relations. Introduction to normalization: steps, functional dependencies, basic normal forms, definition of first, second, third normal form and removing anomalies from the relations. De-normalization and merging relations.

Unit 5

Special Topics (Overview) :Data Warehousing, Data Mining, Distributed Databases.

Text Book(s)

1. . Hoffer, Prescott, " Modern Database Management", Seventh Edition, McFaddenPearson Education.
2. . Kathy Schwalbe, "INFORMATION TECHNOLOGY PROJECT MANAGEMENT", Course Technology Cengage Learning

Reference Material(s)

1. Thomas M. Connolly, Carolyn E. Begg, "Database Systems", Pearson Education.
2. Raghu R and Johannes G., "Database management Systems", Mc Hill 3rd Edition, 2002.
3. Elmasri R, Navathe S, "Fundamentals of Database Systems", Addison Wesley 4th Edition.

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

1st SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

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Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

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Course Name MSc (CS/IT) 1st Semester
Subject Code: IC-4916
Subject Name: Communication Skills and Report Writing

Aim of the Subject

To improve the confidence, communication skills and presentation capabilities of students that will help them in placements and corporate life.

Objectives

To develop effective communication skills in students which will help them in facing interviews and group discussions

Learning Outcomes

1. Improved skills in personal interviews and group discussions
2. Development of power of expression

Unit 1

Basics of Communication

Unit 2

Development of Group Discussion Skills

Unit 3

Development of Presentation Skills and facing interviews

Unit 4

Basics of Written Communication

Unit 5

Intense practice of Presentations, Group Discussions and Interviews

Text Book(s)

1. Communication – K. K. Sinha
2. Organizational Behavior - Fred Luthans
3. Organizational Behavior - Stephen Robbins

Reference Material(s)

1. Communications Skills – M.V. Rodrigues
2. Times of India/ Hindustan Times/ The Hindu etc.

Course Name MSc (CS/IT) 1st Semester
Subject Code: CS-5511
Subject Name: Operating Systems

Aim of the Subject

The course aims to explore the importance of the operating system and its function. The different techniques used by the operating system to achieve its goals as resource manager.

Objectives

1. To learn and understand the Concepts of operating system
2. To Learn and understand operating system services
3. The core structure, functions and design principles of operating system
4. Interposes communications and basic concepts of virtualization

Learning Outcomes

Students will be having understanding of following concepts of Operating System:

1. Process Management
2. Memory Management
3. File & I/O Management

Unit 1

Introduction: Evolution of operating systems, operating system concepts; activities, functions and services of operating system; Computer Systems: Mainframe, Desktop, Multiprocessors, Distributed, Clustered, Real time and Hand held systems. Computer System Operations, Storage hierarchy, Hardware protection, System calls, System structures. Process Management: Process concepts, Process scheduling, Operation on processes.

Unit 2

Cooperating processes, Inter- process communication. Threads: multithreading models, threading issues, thread examples. CPU Scheduling: concepts, scheduling criteria, scheduling algorithms, algorithm evaluation. Process synchronization: Critical section problem, Mutual exclusion and synchronization Techniques of inter process: Synchronization hardware, semaphore, classical problems of synchronization, critical regions and monitors. Deadlock: deadlock characterization, deadlock handling methods.

Unit 3

Memory Management: Concepts, single user memory management. Partition memory allocation: paging, segmentation and segmentation with paging, Virtual memory management: concept, demand paging, process creation, page replacement, allocation of frames and thrashing.

Unit 4

File Management: File concepts, access methods, directory structure, file system mounting, sharing and protection of files. File system structure and implementation, allocation methods, free space management, reliability of file system. Distributed file system and structures.

Unit 5

Device Management: Goals of input/output software design, Structure of device hardware and software. Layers of I/ O software, structure of device drivers, Disk driver, disk arm scheduling algorithms, terminal driver, clock driver, Case study of Windows 2000.

Text Book(s)

A. Silberschatz, P. Galvin and G. Gagne, Operating System Concepts, Addison Wesley, 8th Edition, 2008.

Reference Material(s)

William Stallings, Operating Systems: Internals and Design Principles 4 th Edition, Pearson Education, 2003.

Course Name MSc (CS/IT) 1st Semester
Subject Code: CS-4116
Subject Name: Discrete structure

Aim of the Subject

To give better understanding about the subject so that student are good in problen solving skills as well as they can understand few more subject that are based on Discrete structure.

Objectives

The objective of this course is to teach students how to think logically and mathematically.

Learning Outcomes

Students will learn the basic concepts of sets, permutations, relations, graphs, trees and finite state machines. Students will represent discrete objects and relationships using abstract mathematical structures.

Unit 1

The Foundations: Logic, Sets and Functions: Introduction to set theory, set operations, fuzzy
sets, mathematical logic, prepositions, prepositional equivalences, predicates and quantifiers.
Importance of Quantifiers. Functions, functions for computer science.
Mathematical reasoning: Introduction to Methods of proof, mathematical induction. Use of
mathematical induction to solve different problems. Importance of recursions in computer
science, scope of recursions, Recursive definitions, recursive algorithms.

Unit 2

Combinatorics: The basics of counting, The sum rule, The product rule, The Pigeonhole
Principle, Permutations with repetitions, Permutations without repetitions, Circular Permutations.
Applications of combinations. Applications of Combinatorics to solve Committee problems,
word problems, puzzle problems etc. Applications of Combinatorics to understand Telephone
numbering plan, understanding Internet addresses, Advanced counting techniques, recurrence
relations, solving recurrence relations, algorithm design, Basic understanding of complexities,
basic problems of complexity of algorithms.

Unit 3

Relations: Relation definition , Importance of relations in computer science, Relations and their
properties, Unary relations , Binary relations, Ternary relations , n-ary relations and their
applications, closures of relations, equivalence relations, partial ordering. Representing relations,
relation matrix, relation graph, composite relation. Operations on relations – union, intersection
and join. Concepts of least upper bond, Greatest lower bond, maximal element, minimal element,
Greatest element, Least element of a partially ordered set, lattices, sub lattices, chains and
antichains.

Unit 4

Graphs: Introduction to Graphs, Importance of graph theory in computer science, Graph
terminology, representing graphs, graph types, graph models, and graph isomorphism.
Connectivity, Euler and Hamiltonian Paths, shortest path problems, planar graphs, graph
colouring, chromatic number, Euler's formula, Kuratowski's theorem. The four colour problem,
Applications of Graph Colouring, Introduction to Trees, applications of trees, tree traversal, trees
and sorting, Spanning trees, minimum spanning trees.

Unit 5

Languages and Grammars: Introduction to Languages and Grammars, solving problems for
validity of statements according to the grammar. Importance of Language theory in Computer
Science, Importance of Derivation trees, solving problems of Derivation trees, Importance of
Parsing, Phrase-Structure Grammars, Types of Phrase structure grammars.

Text Book(s)

1. Kenneth H. Rosen "Discrete Mathematics and its Applications", 5th edition, McGraw-Hill
Education.

Reference Material(s)

1. Kolman, Busby and Ross "Discrete Mathematical Structures", 5
th edition, Pearson Education.
2. Narsingh Deo "Graph Theory with Applications to Engineering & Computer Science", 4th
edition, Prentice Hall of India.
3. James L. Hein, “Discrete Structures, Logic and Computability”, 2
nd edition, Narosa
Publishing House.

Course Name MSc (CS/IT) 1st Semester
Subject Code: CS-4205
Subject Name: Programming and Problem-SolvingUsing

Aim of the Subject

To learn the concept of programming and enable students to develop the logical skill to solve complex problems and handle projects

Objectives

1. .To develop programs to solve basic problems by implementing programming concepts like operators, control statements etc.
2. To select the right data representation formats based on the requirements of the problem.
3. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
4. To write programs using the Dynamic Memory Allocation concept.
5. To create, read from and write to text and binary files.

Learning Outcomes

The students are expected to be able to:

1. Formulate the algorithms for simple problems.
2. Correct syntax errors as reported by the compilers.
3. Identify and correct logical errors encountered during execution.
4. Represent and manipulate data with arrays, strings and structures. use pointers of different types.
5. Create, read and write to and from simple text and binary files.
6. Modularize the code with functions so that they can be reused.

Unit 1

Introduction to Computer based Problem Solving; Algorithms and flowcharts; Programming Languages; Classification of Programming Languages; Characteristics of a program; Rules/ conventions of coding, documentation, naming convention; Structured Programming; Modular Programming; Programming Environment: Assembler, Interpreter, Compiler, Linker and Loader.

Unit 2

Fundamentals of C programming; History of C; Structure of C Program; Character set, Identifiers and Keywords; Data types; Constants and Variables; Operators and Expressions, Type Conversion, Operator Precedence and Associativity; Basic Input/Output operations; Decision control structures :if-else, switch-case ; Loop control structure : while, do-while, for; Jump statement : break ,continue ; goto statement.

Unit 3

Array: One dimensional array -Declaration, initialization of one dimensional arrays; Two dimensional array -Declaration, initialization of two dimensional arrays; multi-dimensional array. Strings: Declaring and initializing string, reading and writing strings, string manipulation functions, array of strings. Function: Need of user-defined function, Arguments, return value, return statement; passing parameters – call by value, call by reference; Scope, visibility and lifetime of variables; Nesting of functions; passing arrays to function; passing strings to function. Recursion: basics, comparison with iteration, types of recursion. Storage Classes.

Unit 4

Pointer: Declaring and initializing pointer variables, chain of pointers, Pointer expression, Pointer arithmetic, Array of pointer and its limitations; Pointers as Function arguments; Function returning pointer, Dynamic Memory management functions. Structure: Defining a Structure, Declaring & initializing Structure Variables, Membership Operator, Array in structure, Array of Structure, Structure within structure, Pointer to structure. Union: Defining union, Declaring & initializing union Variables; Bit Fields; Enumerated data type; typedef; Bitwise operators.

Unit 5

Command line arguments; File handling: Defining, opening and closing a file, input/output operations on file, merging files; C preprocessors: Macro substitution, file inclusion, compiler control directive.

Text Book(s)

1. Herbert Schildt, “C The Complete Reference”, Osborne/McGraw-Hill, 4 th Edition, 2000.
2. . Behrouz A. Forouzan and Richard F. Gilberg, “Computer Science: A Structured Programming Approach Using C”, Cengage Learning, 3rd Edition, 2007.

Reference Material(s)

1. B.W. Kernighan, D.M. Ritchie, “The C Programming Language”, Prentice Hall of India, 2nd Edition, 1988.
2. E Balagurusami, “Programming in ANSI C”, Tata McGraw-Hill, 6th Edition, 2012.
3. Byron S Gottfried, “Programming with C”, Tata McGraw-Hill, 3rd Edition, 2010.
4. Yashavant Kanetkar, “Let us C”, BPB Publications, 13th Edition, 2013.
5. Yashwant Kanetkar, “Test your C skills”, BPB Publication, 5th Edition, 2005.

Course Name MSc (CS/IT) 1st Semester
Subject Code: CS-4022
Subject Name: Computer Organization and Assembly Language Programming

Aim of the Subject

This course covers the basics of computer organisation with emphasis on the lower level abstraction of a computer system including digital logic, instruction set and assembly language programming. Topics includes data representation, logic gates, simplifi

Objectives

To understand the structure, function and characteristics of computer systems.
1 To understand the design of the various functional units and components of computers.
1 To identify the elements of modern instructions sets and their impact on processor design.
1 To explain the function of each element of a memory hierarchy,
1 To identify and compare different methods for computer I/O.

Learning Outcomes

On completion of the course, student will be able to :
1 Demonstrate computer architecture concepts related to design of modern processors,
memories and I/Os.
1 Analyze the performance of commercially available computers.
1 To develop logic for assembly language programming

Unit 1

Computer Organization: Digital and Analog computers, Major components of a digital computer, Memory addressing capability of a CPU, Word length of a computer, Processing speed of a CPU, Definitions of Hardware, Software and Firmware. Definitions of Dumb, Smart and Intelligent terminals.
Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes: BCD code, Gray Code, ASCII code, Excess 3 Code, Error detecting Code.

Unit 2

Computer Arithmetic: Binary representation of Negative Integers using 2's complement and Signed magnitude representation, Fixed point Arithmetic operations on Positive and Signed (Negative) Integers like addition, subtraction, multiplication, Booth algorithm for multiplication,. Division of positive and negative binary numbers.

Unit 3

Introduction of 8085 Microprocessor: Architecture of 8085 processor. Register Architecture: Accumulator, Temporally Register and Flag Register. Program Counter, Stack pointer and Instruction register. Addressing Modes: Direct addressing mode and Register direct Addressing Mode. Register Indirect Addressing Mode, Immediate Addressing Mode and Implicit or Implied Addressing Mode.

Unit 4

Introduction to Assembly Language Programming: Various Instructions Classifications: Instruction Format, Opcode, Operand and Hex code. Instruction Operation Status, Various Instruction Sets: Data Transfer Group Instructions, Arithmetic Group Instructions, Logical Group Instruction, Branch Group Instructions: Conditional and Unconditional and Machine control Instructions.

Unit 5

Assembly language programming: Practice on assembly language programming, pinout diagram of 8085 microprocessor, interfacing of 8085 , interrupts, Direct memory access, introduction to 8086 microprocessor.

Text Book(s)

1. . Ramesh S. Gaonkar, Microprocessor Architecture, Programming and Applicationswith 8085/8080. Wiley Eastern Ltd. publication
2. B Ram, Computer Fundamentals: Architecture and Organization, New Age International, 2000
3. V. Rajaraman V and N. Adabala, Fundamentals of Computers, Prentice Hall India Learning Private Limited; 6th Revised edition edition

Reference Material(s)

1. R Theagarajan S Dhanasekaran and S Dhanapal, Microprocessor and Its applications, New Age International (P) Ltd.
2. Nicholas Carter and Raj Kamal, Computer Architecture and Organization, Schaum's Outlines Series
3. Dr. Raj kamal, Digital Systems: Principles and Design, Pearson Education

Computer Organization and Assembly Language Programming

1. 8085 architecture
2. Instruction Set: Characteristics - Operand Types - Operation Types
3. Addressing Modes - instruction Formats
4. Addressing Modes (Simple Examples)
5. Assembly language programming
6. Computer Arithmetic: ALU -. Integer Representation and Arithmetic
7. Floating Point Representation and Arithmetic
8. CPU: Organization of Processors and Registers
9. Instruction Cycle - Instruction Pipelining
10. Register Optimisation - Architecture Pipelining. Instruction Set Architecture(ISA)
11. RISC and CISC, Compare RISC versus CISC
12. Characteristics of RISC, Large Register File
13. Characteristics of CISC, Instruction set complexity
14. Control Unit: Micro-Operations - Control of Processors
15. Explain how programs written in high-level languages are executed by a computer system.
16. Explain what hardware factors impact program performance and how to write programs for performance
17. Explain data representation, instruction sets, and addressing modes.
18. Write assembly language programs employing flow control constructs and procedures.
19. Explain techniques used by computer hardware designers to improve performance.
20. Explain how a data path can be implemented as a single-cycle or pipelined design.
21. Explain how the memory hierarchy impacts performance.
22. Explain the reasons for the ongoing transition to multiprocessor architectures.

CS-5511

Operating Systems

Lab Assignments

1. Implementation of FCFS (First Come First Serve) CPU Scheduling.
2. Implementation of SJF (Shortest Job First) CPU Scheduling.
3. Implementation of Round Robin (RR) CPU Scheduling.
4. Implementation of Priority CPU Scheduling Algorithm.
5. Implementation of FIFO Replacement Algorithm.
6. Implementation of Optimal Page Replacement Algorithm.
7. Implementation of LRU Page Replacement Algorithm by Stack method.
8. Implement the producer-consumer problem using threads.

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

3rd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

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Course Name MSc (CS/IT) 3rd Semester
Subject Code: CS 5123
Subject Name: Theory of Computation

Aim of the Subject

The theory of computation is the branch of computer science that deals with whether and how efficiently problems can be solved on a computer. In order to perform a rigorous study of computation, computer scientist's work with mathematical abstractions of computers called a model of computation.

Objectives

1. . Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
2. . Enhance/ develop students' ability to understand and conductmathematical proofs for computation and algorithms.

Learning Outcomes

Upon successful completion of this course, you will be able to

1. Discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
2. . explain the models of computation, including formal languages, grammarsand automata, and their connections.
3. . Analyze and design finite automata, pushdown automata, Turing machines,formal languages, and grammars.
4. Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

Unit 1

Theory of Automata: String, Alphabet and Languages, Finite Automata, Finite State machine, Basic Definition. Description of a Finite Automaton, Deterministic Finite Accepters Transition Graphs, Languages, Non-deterministic Finite Acceptors-Definition, Finite Automata with ϵ- moves, Equivalence of Deterministic and Non-deterministic Finite Accepters, Conversion of NDFA to DFA, Removal of ϵ transition from ϵ – NDFA, Minimization of Finite Automata – Definition and Construction. Mealy and Moore models Definitions, Transformation of Mealy Machine into Moore Machine and vice-versa.

Unit 2

Properties of Regular Sets: Pumping lemma for regular set, Closure properties of regular set. Formal Language: Basic Definition, Chomsky Classification of languages, Initialization of Finite Automata Regular Expression and Language Regular Expressions, Connection between Regular Expressions and Regular Languages.

Unit 3

Regular Grammars – Right and Left Linear Grammars, Equivalence between Regular Languages and Regular Grammars. Context-Free Grammars: Leftmost and Rightmost Derivations, Derivation Trees, Parsing and Ambiguity, Simplification of CFGs. Chomsky Normal Form, Greibach Normal Form, Cocke-Kasami- Younger Algorithm, Properties of Context-Free Languages.

Unit 4

Pushdown Automata: Definition, Non-deterministic Pushdown Automata, Pushdown Automata for Context Free Languages Context- Free Grammars for Pushdown Automata. Deterministic Pushdown Automata and Deterministic Context- Free Languages.

Unit 5

Turing Machine: Definition of Standard Turing Machine, Turing Machine as Language Accepters and Transducers.

Text Book(s)

1. Mishra and Chandrasekaran, Theory of Computer Science (Automata, language and Computation), 2nd Ed. Prentice Hall of India.
2. J. E. Hopcroft, R. Motwani and J.D Ullman, Introduction to Theory, Languages and Computation; Second Edition, Addison-Wesley, 2001 Narosa Publishing House.

Reference Material(s)

1. Moll, Arbib and Kfoury, an Introduction to Formal Language Theory, Springer-Verlag.
2. Martin, J. C.: Introduction to Languages and the Theory of Computation, McGraw-Hill, Inc.,3rd ed., 2002. ISBN 0-072-32200-4.
3. Brookshear, J. G.: Theory of Computation: Formal Languages, Automata, andComplexity, Benjamin/Cummings Publishing Company, Inc, Redwood City, California, 1989. ISBN 0-805-30143-7.
4. Peter Linz, An Introduction to Formal Languages and Automata, Narosa

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

3rd SEMESTER

Session 2020 - 2021

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Course Name MSc (CS/IT) 3rd Semester
Subject Code: CS-5713
Subject Name: Data Analytics using R

Aim of the Subject

This course aims to provide sound foundation to fundamental concepts of machine learning and its application and prepare students for advanced research and real time problem solving in machine learning and related fields.

Objectives

1. . Ability to understand, analyze and design solutions with professional competency for the real-world problems.
2. Ability to develop software solutions for the requirements, based on critical analysis and research.

Learning Outcomes

1. . Understand the fundamental concepts of data analytics.
2. . Evaluate the data analysis techniques for applications handling large data. 3. Demonstrate the various machine learning algorithms used in dataanalytics process.

Unit 1

Introduction: What is Data Analytics?, The Data Analytics Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit 2

Regression:Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression.

Unit 3

Classification: Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Preventing Overfitting in Decision Trees, Handling Missing Data, Boosting, Precision- Recall, Scaling to Huge Datasets & Online Learning.

Unit 4

Clustering & Retrieval: Nearest Neighbor Search, Clustering with k-means, Mixture Models, Mixed Membership Modeling via Latent Dirichlet Allocation, Hierarchical Clustering

Unit 5

Informative Projections: Linear Projections, Principal Component Analysis I : One Dimensional Projection, Principal Component Analysis II: The Top k Directions Lab: Overview of R, R data types :Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and t imes. Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers, Cleaning Data with R.

Text Book(s)

Required Texts:

[1]Allan G. Bluman, Elementary Statistics: A Step By Step Approach,10 th Edition,McGraw-Hill, 2017.

[2] Tom Mitchell, Machine Learning, First Edition, McGraw Hill 1997.

[3] Use R resources on tutorial point.

Reference Material(s)

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

3rd SEMESTER

Session 2020 - 2021

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Course Name MSc (CS/IT) 3rd Semester
Subject Code: CS- 4211
Subject Name: Object Oriented Programming Using JAVA

Aim of the Subject

To give students a good understanding of basic concepts of object-oriented program design using JAVA. To teach and enable students to develop object- oriented programming skills within the Java language; to enable students to develop object-oriented Java program solutions to small application problems.

Objectives

Briefly describe any course development objectives that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

As the technologies in Java are changing frequently so with the textbook, latest changes will also be incorporated in the course using web- based material. Students will also be given programming examples and exercises on every topic. The programming assignments will be checked every week in the computer-lab

Learning Outcomes

- Understand basic principles of object-oriented program design using Java.
- Understand the basic and some advanced issues related to writing classes and methods lll such as data, visibility, scope, method parameters, object references, and nested classes.
- Understand the basic ideas behind class hierarchies, polymorphism, and programming to interfaces.
- Get exposure to exceptions and basic I/O streams.
- Develop solid Java programming skills and the ability to put in practice the acquired knowledge and understanding of the Java language and object-oriented design in relatively simple case studies

Unit 1

Introduction to Java: Features of Java, Object-oriented Programming Overview, Introduction of Java Technologies, Java Applets and Applications, Java Platform, Java Program structure, Basic Building Blocks (comments, character set, constants), Data Types, Variables, Operators, Expressions, Typecasting, Control Structures, Loops, Memory concepts, Introduction to Class, Objects, Methods and Instance Variables, Naming Conventions, Constructors, Method Overloading, Static Method, Static Field, Math Class, this reference, Garbage collection and finalize method.

Unit 2

String Handling: The String Constructors, String Operations, Character Exaction, String Comparison, String Buffer. Arrays: Creating an array, Enhanced for Statement, Passing Multidimensional Arrays, Arrays to Method, Variable-Length Argument lists, Using Command-line Arguments. Wrapper Class : Introduction to wrapper classes. Inheritance: Relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses, The Object Class, Object Copying in Java. Polymorphism: Method Overriding, Upcasting, Dynamic Method Dispatch, final Field, Method and classes, Abstract classes and Methods, instance of operator, Downcasting, Class class, Runtime type Identification

Unit 3

Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, Creating own Packages. Defining an Interface, Properties of Interface, Advantages of Interface Achieving Multiple Inheritance through Interfaces, Variables in Interfaces, Comparable Interface. Exception Handling: Introduction, keywords, Types of Exceptions, Java Exception Hierarchy, finally Block, Chained Exceptions, Declaring new Exception Types, Preconditions and Post-conditions. Streams and Files: Introduction, Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream Class Hierarchy.

Unit 4

Multithreading: Introduction, Java Thread Model, Thread priorities, Thread life cycle, Creating Thread, Thread Execution, Thread Synchronization, Classes and Interfaces in java. util.concurrent, Monitor and Monitor Locks, Inter-Thread Communication. Introduction To GUI : Introduction, Overview of swing Components, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, Adapter Classes, Layout Managers Applets: Applet Basics, Applet Architecture, Applet Life Cycle Methods, Applet HTML Tag and Attributes, Executing Applet in Web Browser and in Appletviewer.

Unit 5

Generic and Collection API: Introduction, Motivation for Generic Methods, Generic Methods: Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance Database connectivity: JDBC, The design of JDBC, Executing Queries. New Feature of Java: Java Reflection API, Auto boxing, Annotations, Regular Expressions.

Text Book(s)

1. Java 2: The Complete Reference by Herbert Schildt, Tata Mc Graw- Hill, 8th Edition,
2011.

Reference Material(s)

1. The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rd Edition, Pearson Education, 2000.

2. Head First Java, Kathy Sierra, Bert Bates, O'Reilly Publication, 2nd Edition, 2005.

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

3rd SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name MSc (CS/IT) 3rd Semester
Subject Code: CS-4508
Subject Name: Computer Graphics and Multimedia

Aim of the Subject

This course aims to combine theoretical approaches with modern techniques of computer graphics and multimedia to design graphics software systems.

Objectives

To introduce the use of the components of a graphics system and become familiar with the building approach of graphics system components and algorithms related to them.

Learning Outcomes

1. . To provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
2. . To provide an understanding of mapping from world coordinates to device coordinates, clipping, and projections.
3. . To learn the basic principles of 3-dimensional computer graphics.
4. . To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
5. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Unit 1

Introduction to Computer Graphics, Application of Graphics, Display Devices: Refresh Cathode -Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Flat Panel Displays. Video cards/ display cards, Input Devices: Mouse, Trackball, Space ball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. Hardcopy Devices: Printers and Plotters.

Unit 2

Graphics Primitives: Line Generation Algorithms: DDA algorithm, Bresenham' s algorithm, Graphics Primitives: Circle Generation Algorithms: Midpoint Circle algorithm, Bresenham's circle generation algorithm, Ellipse Generation algorithm, Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm.

Unit 3

Clipping: Clipping operations, Point clipping, Line clipping: Cohen Sutherland Algorithm, Liang Barsky Algorithm. Polygon clipping: Sutherland- Hodgeman Algorithm.

Unit 4

Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear, Homogenous coordinate system, composite transformations, raster method of transformation Two Dimensional Viewing: Window to Viewport coordinate transformation, Three Dimensional: 3 D Geometry, 3D display techniques, transformations. Projections: Parallel Projection, Perspective Projection.

Unit 5

Color Models and Color Application: Color models: Properties of Light. Standard Primaries and the Chromaticity Diagram, RGB Color Model, CMY Color Model, HSV Color Model, YIQ color model. Advancements in the technology in Computer Graphics. Multimedia: Introduction, Multimedia applications, Multimedia data and File formats.

Text Book(s)

1. . Donald Hearn and M. Pauline Baker, Computer Graphics: C Version, Second Edition, Prentice-Hall of India.
2. . Tay Vaughan, Multimedia: Making it Works, Seventh Edition, Tata McGraw-Hill Professional, New Delhi.

Reference Material(s)

1. David F. Rogers, Procedural Elements for Computer Graphics, Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, 2001.
2. . James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics: Principles and Practice in C, Second Edition, Addison-Wesley Professional.
3. Zhigang Xiang, Roy A. Plastock, Schaum's outline of Theory and Problems of Computer Graphics, Second Edition, Tata McGraw-Hill Professional, New Delhi

SYLLABUS

M.SC. (COMPUTER SCIENCE / INFORMATION TECHNOLOGY)

3rd SEMESTER

Session 2020 - 2021

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Course Name MSc (CS/IT) 3rd Semester
Subject Code: CS 5613
Subject Name: Computer Network

Aim of the Subject

As a result of rapid technological progress, the old model of a single computer serving all the organization's computational needs has been replaced by a large number of separate but interconnected computers.

Objectives

1. . Develop knowledge of the function of both hardware (basics) and software aspects of computer network systems.
2. . Understand the fundamental principles of various networking architectures and their protocols.
3. . Gain an understanding of the principles of operation of a wide variety of network technologies.
4. Develop an appreciation of how network services are developed and knowledge of their uses.
5. . Apply knowledge of computers, software, networking technologies, and information assurance to an organization's management, operations, and requirements.
6. . Prepare to continue their studies to obtain various industry certifications.
7. . Computer networks is a rapidly evolving field, with new standards and improvements in data communication technology occurring, for this included the topics of CSMA/ CA, wireless LANs, IPv 6 , new developments in application layer protocols etc.

Learning Outcomes

1. . Familiarity with network terminologies, reference model, applications of network, design issues and how computer network works?
2. . Knowledge of Data link layer design issues, Framing, Error correction and Detection techniques.
3. . Meaning of flow control and its methods.
4. . Problems associated with broadcast network and multiple accesscontrol protocols.
5. Knowledge of IEEE 802.3, 802.4 and 802.5, 802.11
6. Latest LAN examples.
7. . Design issues related to Network layer like routing, addressing and their protocols.
8. . Introductory knowledge of Transport layer protocols like TCP and UDP. 9. Idea about client server architecture and working of DNS, HTTP and E Mail.

10. Security issues in computer network and Introduction to Cryptographic algorithms and Digital Signature.

Unit 1

Introduction - Computer Network, Goals and Applications; Network Classification: Broadcast & point- to-point networks, LAN, MAN & WAN networks; protocol hierarchies; design issues for the layers. Connection Oriented and Connection less services, Service primitives, Relationship between Services and Protocols; Switching Techniques – Circuit Switching and Packet Switching; Reference models – OSI and TCP/IP, comparison and critique of OSI and TCP/IP reference models, Internet Concept.

Unit 2

Data Link Layer: Design issues – Services, Framing, Error Control and Flow Control; Error Detection Techniques - Parity Check and Cyclic Redundancy Check (CRC); Error Correction Technique - Hamming code; Elementary Data Link Protocols - Unrestricted Simplex Protocol, Simplex Stop- and- Wait Protocol, Sliding Window Protocols: One-Bit Sliding Window Protocol, protocol using Go Back N and Selective Repeat; HDLC protocol; Data link layer in the Internet - SLIP and PPP.

Unit 3

MAC Sublayer - Multiple access protocols: Aloha, CSMA Protocols; Collision-Free Protocols, IEEE MAC Sublayer protocols : Ethernet cabling, 802.3 protocol, 802.4 MAC sublayer protocol, 802.5 MAC sublayer protocol and their management. High speed LANs : Fast Ethernet, FDDI; Wireless LANs; Bluetooth; data link layer switching- Bridges and Switches, their difference with Repeaters, Hubs, Routers and Gateways.

Unit 4

Network Layer - Design issues; Routing Principles; Routing Algorithms: Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing. Link State Routing, Hierarchical Routing, Broadcasting Routing, Multicast Routing; The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols.

Unit 5

Transport Layer - The transport Services; The Internet Transport Protocols: UDP and TCP; The TCP Service Model. Application layer - Client Server Architecture; DNS; WWW and HTTP; Proxy Server; E-mail Protocols; FTP; TELNET. Network Security - Cryptography, Symmetric- key Algorithms, Public- key Algorithms; Digital Signatures

Text Book(s)

Computer Networks, Andrew S. Tanenbaum, Pearson Education, 5th Edition.

Reference Material(s)

1. Data Communications and Networking, B.A. Forouzan, McGraw-Hill, 5th Edition.
2.Computer Networking : James F. Kurose & Keith W. Rose , Pearson Education, Third Edition, 2005.
3.Communication Networks : Fundamentals Concepts and Key Architecture : Alberto Leon-Garcia and Indra Widjaja, , Tata Mc Graw-Hill Publishing Company Limited, ISBN 0-07-0402235-3.
4. Data and Network Communication : Michael A. Miller, Delmar Thomson Learning inc. ISBN 0-07668-1100-X.
5. Introduction to Computer Networks : Douglas E. Comer , Prentice-Hall.
6. Alberto Leon-Garcia and Indra Widjaja, Communication Networks –Fundamentals Concepts and Key Architecture , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235 -3 .
7.Data and Computer Communications : W.Stallings, , Prentice-Hall, 5th Ed., 1997.

SYLLABUS

M.Tech. (COMPUTER SCIENCE)

1st SEMESTER

Session 2020 - 2021

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Course Name MTech (CS) 1st Semester
Subject Code: CS -5010
Subject Name: Advanced Computer Architecture

Aim of the Subject

Appreciate the technical skills necessary to be a capable computer architect.

Objectives

1. Understand the role of abstraction in the design of large digital systems, and explain the major software and hardware abstractions in contemporary computer systems.
2. . Analyze the performance of digital systems using measures such as latencyand throughput.
3.Design simple hardware systems based on a variety of digital abstractions such as ROMs and logic arrays, logic trees, state machines, pipelining, and buses. synthesize digital systems from a library of representative components and test the designs under simulation.
4. Understand the operation of a moderately complex digital system -- a simple RISC-based computer -- down to the gate level, and be able to synthesize, implement, and debug its components.
5. Understand the design of Multiprocessor systems.
6. Understand the operations of cloud.

Learning Outcomes

1. Complete and debug the design of a simple CPU with a given RISC-based instruction set.
2. . Measure the memory access performance of a processor, and tune cachedesign parameters to improve performance.
3. Analyze the operation of page-based virtual memory systems.

Unit 1

Instruction Set Architectures: The von Neumann Model, Key Idea: Stored-program Computer, Anatomy of a von Neumann Computer, Instructions, Instruction Set Architecture (ISA), ISA Design, Beta ISA: Storage, Storage Conventions, Beta ISA: Instructions, Beta ALU Instructions, Beta ALU Instructions with Constant, Beta Load and Store Instructions,Beta Branch Instructions, Beta JMP Instruction

Unit 2

Building the Beta: CPU Design Tradeoffs, Processor Performance, Approach: Incremental Featurism, Multi-ported Register File, ALU Instructions, Instruction Fetch/Decode, ALU Op Datapath I, ALU Op Datapath II, Beta ALU Instructions, Beta ALU Instructions with Constant, Beta Load and Store Instructions,Beta Branch Instructions, Beta JMP Instruction, LDR Instruction , Exceptions, Exception

Processing, Exception Implementation, Beta: Our "Final Answer", Control Logic The Memory Hierarchy: Memory Technologies, Static RAM (SRAM), Dynamic RAM (DRAM), Non-Volatile Storage: Flash, Non-Volatile Storage: Hard Disk, The Locality Principle, Caches, A Typical Memory Hierarchy, Basic Cache Algorithm, Direct-Mapped Caches, Fully-Associative Cache, N- way Set-Associative Cache , Replacement Policies, Write Policy, Write-back, Write-back with " Dirty" Bits, Summary: Cache Tradeoffs

Unit 3

Pipelining the Beta: Reminder: Single-Cycle Beta, Pipelined Implementation, Pipeline Hazards, Simplified Unpipelined Beta Datapath, 5 -Stage Pipelined Datapath, Pipelined Control, Pipeline Diagrams, Data Hazards, Resolving Hazards, Stall Logic , Bypass Logic, Control Hazards, Resolving Control Hazards, Branch Prediction , Exceptions

Unit 4

Parallel Processing: Processor Performance, 5 -Stage Pipelined Processors, Improving 5-Stage Pipeline Performance, Instruction-level Parallelism (ILP), Wider or Superscalar Pipelines, A Modern Out-of-Order Superscalar Processor, Multicore Processors, Multicore Caches, Fix: "Snoopy" Cache Coherence Protocol

Unit 5

Cloud Computing Architecture: Cloud Computing, Advantages and Disadvantages, History of Cloud, Cloud Computing Technologies, Cloud Computing vs Grid Computing, How Cloud Works, Cloud Computing Applications, Security Risks of Cloud Computing, Types of Cloud: Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud, Cloud Service Models, Virtualization

Text Book(s)

Computation Structures (MIT Electrical Engineering and Computer Science)
by Stephen A. Ward , Robert H. Halstead

Reference Material(s)

https://computationstructures.org/

Course Name MTech (CS) 1st Semester
Subject Code: CS-5413
Subject Name: Data Mining and Warehousing

Aim of the Subject

To clear the concepts, applications and research challenges of data mining and data warehousing.

Objectives

•1.To present an overview of data warehousing process.
•2. To make students understand tools and techniques of On Line Analytical Processing (OLAP)
•3. Learn to create data warehouse data models, data warehouse design, storage and implementation techniques.
•4. Identify and learn useful algorithms to discover useful knowledge out of tremendous data volumes. Also to determine in what application areas can data mining be applied.
•5. To present an overview of Big Data Analytics techniques.

Learning Outcomes

A student completing course unit 1 should:
1) Have an understanding of the foundations, the design, the maintenance, the evolution, and the use of data warehouses
2) To understand data warehouse architecture.
3) To understand the step by step process of data warehouse development including data extraction, cleaning, loading and refreshing.
4) To understand various issues related to improvement in performance of data warehouse.

A student completing course unit 2 should:
1) Practice SQL & PL/ SQL required in data warehouse environment.
2) To master the basic range of techniques for creating, controlling, and navigating dimensional business databases, by being able to use a tool for dimensional modeling and analysis.
3) Understand multidimensional data model, OLAP, OLAP operations and work on OLAP queries

A student completing course unit 3 should:
1) Understand the fundamentals of data mining Data Mining Functionalities.
2) Have an understanding of the data mining process, its motivation, applicability, advantages and pitfalls.
3) Understand how to move from Data Warehousing to Data Mining,
4) Understand Issues and challenges in Data Mining.
5) Understand Data Mining Query Languages and Data Mining applications

A student completing course unit 4 should:

1) Understand different data mining techniques.

2) Understand various algorithms to find association rules.

3) Have an understanding of the principles, methods, techniques, and tools that underpin successful data mining applications.

4) Understand different clustering techniques.

5) Understand data mining through Decision Trees, Neural networks and Genetic Algorithm.

A student completing course unit 5 should:

1)) Understand what is Web Mining, Web content mining, Web Structure mining and to know the concept of Text mining.

2) Understand the concept of Temporal Data Mining, Spatial Data Mining.

3) Be able to understand the methods and techniques of Big Data Analytics.

Unit 1

Introduction: Data Warehouse, Evolution, Definition, Very large database, Application, Multidimensional Data Model, OLTP vs Data Warehouse, Warehouse Schema, Data Warehouse Architecture,
Data Warehouse Server, Data Warehouse Implementation, Metadata, Data Warehouse Backend Process: Data Extraction, Data Cleaning, Data Transformation, Data Reduction, Data loading and refreshing. ETL and Data warehouse, Metadata

Unit 2

Structuring/ Modeling Issues, Derived Data, Schema Design, Dimension Tables, Fact Table, Star Schema, Snowflake schema, Fact Constellation, De-normalization, Data Partitioning, Data Warehouse and Data Marts. OLAP, Strengths of OLAP, OLTP vs OLAP, Multi-dimensional Data, Slicing and Dicing, Roll-up and Drill Down, OLAP queries, Successful Warehouse, Data Warehouse Pitfalls, DW and OLAP Research Issues, Tools. SQL Extensions, PLSQL.

Unit 3

Fundamentals of data mining, Data Mining definitions, KDD vs Data Mining, Data Mining Functionalities, Issues and challenges in Data Mining. Data Mining Primitives, Descriptive and Predictive Data mining, Data Mining applications-Case studies. Association rules: Methods to discover association rules. Various algorithms to discover association rules l ike A Priori Algorithm. Partition, Pincer search, Dynamic Itemset Counting Algorithm etc

Unit 4

Cluster Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Algorithms, Hierarchical and Categorical clustering, Decision Trees, Neural networks, Genetic Algorithm, SVM, Regression

Unit 5

Web Mining , Web content mining, Web Structure mining, Text mining, Temporal Data Mining, Spatial Data Mining, Introduction to Big Data Analytics

Text Book(s)

1. Data Mining Techniques – ARUN K PUJARI, Second Edition, University Press, 2001
2. Data Mining-Introductory and Advanced Topics-Margaret H. Dunham,
2. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India.
3. Building the Data Warehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.Fourth Edition
4. . The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT Third Edition

Reference Material(s)

Essential References

1. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
2. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION
3. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION

Course Name MTech (CS) 1st Semester
Subject Code: CS-6220
Subject Name: Internet Programming Using Java

Aim of the Subject

To make students learn fundamental concept of coding and perform them practically and to develop problem-solving skills

Objectives

1.To make students learn the basics of coding.
2.To develop concepts in a logical and creative way.

Learning Outcomes

Description of knowledge to be acquired:
A student completing course unit 1 should :
1. Have an understanding of basics of coding with syntax.
2. To perform concepts practically including topics of core java.

A student completing course unit 2 should :
1.Have understanding of concepts logically.
2. Develop programming solving skills.
3.Have improvement of mathematical logics.
4.understand of concepts practically of inheritance ,exceptional handling, multithreading ,applets and Jdbc.

A student completing course unit 3 should :
1.Have understanding of fundamentals of HTTP and servlets.
2.Have understanding methods and to perform them practically.

A student completing course unit 4 should :
1.Have understanding of basics of Jsp
2.Have understanding of Jsp lifecycle and connection of Jsp with different database like oracle, ms-sql server and performing operations.

A student completing course unit 5 should :
1.Have understanding of basics of EJB and its types.
2.Have knowledge of creating and working with session bean.

Unit 1

Review of java concepts: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, control statements, looping, Method Call Stack and Activation Record, Argument Promotion and Casting, Scope of declaration and Method Overloading, String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer. Arrays: Declaring and Creating

Arrays, Enhanced for Statement, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments

Unit 2

Inheritance: Extending classes & related things. Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Multithreading: What are threads, The java thread model, Thread priorities, Thread life cycle, Thread Synchronization, Applets: Applet basics, Applet Architecture, Applet life cycle methods, Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC

Unit 3

Introduction to HTTP, web Server and application Servers, Installation of Application servers, Config files, Web.xml. Java Servlet, Servlet Development Process, Deployment Descriptors, Generic Servlet, Lifecycle of Servlet. Servlet Packages, Classes, Interfaces, and Methods, Handling Forms with Servlet, Various methods of Session Handling, various elements of deployment descriptors,

Unit 4

JSP Basics: JSP lifecycle, Directives, scripting elements, standard actions, implicit objects. Connection of JSP and Servlet with different database viz. Oracle, MS-SQL Server, MySQL. java.sql Package. Querying a database, adding records, deleting records, modifying records, types of Statement. Separating Business Logic and Presentation Logic, Building and using JavaBean. Session handling in JSP, Types of errors and exceptions handling.

Unit 5

MVC Architecture Introduction to Remote Method Invocation, Introduction to Enterprise Java Bean, Types of EJB, Creating and working with Session Bean

Text Book(s)

1. . Java 2: The Complete Reference by Herbert Schildt, Tata McGraw- Hill, 8 thEdition, 2011.
2. K. Mukhar, “Beginning Java EE 5: From Novice to Professional”, Wrox Press.

Reference Material(s)

1. . The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rdEdition, Person Education, 2000.
2. Head First Java, Kathy Sierra, Bert Bates, O’Reilly Publication, 2nd Edition, 2005
3 . M. Hall, L. Brown, “ Core Servlets and Java Server Pages”, 2 nd edition, Pearson Education
4. G. Franciscus, “Struts Recipes”, Manning Press

5. C. Bauer, G. King, “Hibernate in Action”, Manning Press
6. B. Basham, K. Sierra, B. Bates, “Head First Servlet and JSP”, 2nd Edition, O'Reilly Media.

CS-5010: Advanced Computer Architecture Assignments

1. Consider a workload where 50% of the execution time consists of multimedia processing for which the MMX instruction set extensions might be helpful. According to Amdahl's law, what is the maximum speedup that can be achieved by implementing them?
2. When pipelined microprocessors were first becoming more common (early to mid 80's) designers believed that RISC instruction sets were easier to pipeline because...?
3. We have seen how pipelining improves the instruction throughput increasing effective performance. Machines with deeper pipelines perform less work per pipestage but have more "in-flight" instructions processing at the same time allowing instructions to complete at a higher rate. In class we discussed several reasons why the effectiveness of deeply pipelined machines can be limited – too much pipelining can be detrimental. Describe two reasons here.
4. List and explain three types of pipeline hazards.
5. List and explain three types of cache misses.
6. Implement a simulator for Beta machine.

CS-5413: Data Mining and Warehousing

ASSIGNMENTS and LAB Manual :

1. Search a voluminous data file and understand it.(hint: you may get free data from internet)
2. Replace all tabs with commas from file or vice versa.
3. Normalize the data: for each value, set the minimum value to 0 and the maximum to 100.
4. Transform the data file (text, excel etc) into database.
5. Create a subject oriented data warehouse.
6. Analysis of existing data (semantical correctness, completeness)
7. Use of free ETL tool.
8. Use of data mining algorithms.
9. Describe an application area where data mining algorithms can be applied. Description should contain application scenario, scale of the problem, existing approach, data mining algorithm that can be used and the benefits of using the algorithms, Prepare data mining models.

Note: Extra assignments may be provided in classroom.

PROJECT (Any One for one team):

Data mining application using any freeware data mining tool.

Deliverables:

a. **Project proposal**: A one-page description of what you plan to do for your project, due Nov. 1st. Please include:
   i. Who is in your group
   ii. Project title
   iii. Brief description of the problem you'll solve or the question you'll investigate
   iv. What data you'll use and where you'll get it
   v. Which algorithms/techniques you plan to use

b. **Final project write up** This is a comprehensive description of your project. You should include the following:

   1. Project idea
   2. Details of data
   3. ETL and Data mining implementation
   4. Key results and metrics of your system

c. **Final presentation**: In the last week of class , each team will present their project to the rest of the class. The presentation should not be more than 15 minutes.

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CS-6220: Internet Programming using Java

M.Tech.(CS) & (NM)

Assignment

Note :

Study the uploaded PDF and PPT that we had discussed earlier in class ,based on this study and prepare assignment in word file .

Q1. Write a java program that has a method for the calculation of fourth power of 2.

Q 2. Write a java program that will accept command line argument and print the same.

Q 3. Write a java program that has a method for initialization of variable to 10 and 20 &another method display the same.

Q 4. Write a java program that prints the different time zones available with the time zones class.

Q 5. Write a java program that prints details about current date, time, month, year, day of the month, day of the week.

Q 6. Write a java program that will display the message "weight of bundle -5 kgs" in a constructor &display the weight in kilograms & grams.

Q 7. How to determine upper bound for two dimensional array in java.

Q 8. Write a java program to read 10 numbers and store in array .list out duplicate numbers, number of times duplication occurs.

SYLLABUS

M.Tech. EXECUTIVE(CS)

1st SEMESTER

Session 2020 - 2021

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Course Name MTech Executive CS 1st Semester
Subject Code: CS-6221
Subject Name: Advance Algorithm Design

New Syllabus Added in Session 2020-21

Aim of the Subject

This course aims to assist learners develop advanced algorithm design, analysis abilities and also efficient programming approaches to solve a range of challenging problems.

Objectives

1.To able students to select suitable data structures, understand the available l ibraries, and utilize it to develop algorithms for a particular problem.
2.To make students understand how to describe an algorithm's worst-case time complexity, order notation and various complexity measures.
3.To explain different advanced design and analysis methods such as greedy algorithms ,dynamic programming , string matching and parallel algorithms.

Learning Outcomes

1.Ability to develop algorithms using advance data structures and implement various operation on it.
2.Ability to comprehend mathematical model, evaluation of complexity and methodologies for solving algorithm recurrence relations.
3.Ability to understand and implement divide and conquer algorithm for various problems.
4.Ability to design algorithms using standard paradigms like: greedy approach and dynamic programming.
5.Ability to utilize principles of algorithm design for string matching and parallel programming.

Unit 1

Basic Data Structures: Array, Stack,Queue, Linked List, Tree, Graph and Hash Tables Java Collection Framework: ArrayList, LinkedList, List Interface, HashSet, LinkedHashSet, TreeSet, Map Interface, HashMap, LinkedHashMap , Tree Map, Hashtable, Vector.

Unit 2

Algorithms and their Analysis: Role of algorithms in computing, Analyzing Algorithms, Designing Algorithms, Growth of Functions,Asymptotic Analysis, Asymptotic Notations,Analyzing Algorithm Control Structure.
.
Recurrence Relation: Recurrence Relation Overview,The substitution method for solving recurrences, The recurrence-tree method for solving recurrence, The master method for solving recurrence and recursions.

Unit 3

Divide and Conqure: Introduction to divide and conquer technique, Analysis, Design and Comparison of various algorithms based on this technique, Example Binary Search, Merge Sort, Quick Sort, Max-Min Problem, Strassen's Matrix Multiplication.

Unit 4

Greedy Method : Knapsack Problem, Job Sequencing With Deadlines, Activity – Selection, Huffman Codes, Minimum Spanning Tree by Prim'S And Kruskal'S Algorithms, Dijkstra's Shortest Path Algorithm.

Dynamic Programming : Concept Of Dynamic Programming,0/1 Knapsack, Reliability Design, Floyd-Warshall Algorithm, Matrix-Chain Multiplication, Longest Common Subsequence.

Unit 5

String Matching : Introduction to string-matching problem, Naive algorithm, Rabin Karp, String Matching with Finite Automata, Knuth Morris Pratt, Boyer Moore algorithms and complexity analysis.

Parallel Algorithm : Introduction to Parallel Algorithm , Parallel Algorithm Analysis, Parallel Algorithm Models, Parallel Algorithm Structure, Design Techniques, Parallel Algorithm - Sorting

Text Book(s)

1.Cormen, Lieserson, Rivest "Introduction to Algorithms", 2 nd Edition, MIT Press, 2009.

2.. E Horowitz S Sahani, S Rajasekaran, " Computer Algorithms", Second Edition, Silicon Press, 2007.

3.Schildt, Herbert, "Java: The Complete Reference", Ninth Edition. US: McGraw-Hill Osborne Media, 2014.

4.. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2 nd Edition, Pearson, 2004.

M. T Goodrich, R Tomassia. "Algorithm Design – Foundations, Analysis, and Internet Algorithms", John Wiley, 2006.

Reference Material(s)

Course Name MTech Executive CS 1st Semester

New Syllabus Added in

Subject Code: CS-6418

Subject Name: Advanced Database Management Systems

Aim of the Subject

To develop computer applications and systems for real world problems using different kinds of databases.

Objectives

1. To make the students understand the advance database concepts for relational model.
2. To understand about usage of Query Optimization, Transaction management, and database administration techniques.
3. To the design and implement object oriented and distributed databases.
4. To make the students understand about data warehousing and data mining concepts in decision support system.

Learning Outcomes

1. To write complex queries including joins and able to apply normalization.
2. To design optimized queries and apply indexing and hashing concepts.
3. To the design and implement object oriented databases.
4. To the design and implement parallel and distributed databases.
5. To apply data mining and data warehousing concepts in real world applications.

Unit 1

Relational Databases:

Relational model concepts, Relational database schemas, Integrity Constraints, Functional Dependency, Multi-valued Dependency, Database Normalization, Normal Forms

Unit 2

Query Processing and Optimization:

Evaluation of Relational Operations, Transformation of Relational Expressions, Query Processing, Query Optimization, Indexing and Hashing, Transactions and concurrency control.

Unit 3

Object Oriented and Object Relational Databases:

Modelling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases

Unit 4

Parallel and Distributed Databases:
Distributed Data Storage, Fragmentation & Replication, Location and Fragment Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modelling and Concurrency Control, Distributed Deadlock, Commit Protocols.

Unit 5

Data Warehousing, Decision Support and Data Mining:
Introduction to decision support, OLAP, Multidimensional model, Window queries in SQL, Finding answers quickly, Implementation techniques for OLAP, Data Warehousing, Views and Decision support, View materialization, Maintaining materialized views.
Introduction to Data Mining: Concepts and techniques, Classification, Clustering, Fundamentals of Data Analytics.

Text Book(s)

1. A. Silberschatz, H. Korth, S. Sudarshan, Database system concepts, 5/e, McGraw Hill, 2008.
2. Ramez Elmasri & Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson Education , 2004.
3. . Han Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers.

Reference Material(s)

1. Prabhu C.S.R., "Object Oriented Database Systems", PHI, 2003.
2. Tamer Ozsu M., Patrick Ualduriel, "Principles of Distributed Database Systems", Second Edition, Pearson Education, 2003.

SYLLABUS

M.Tech. (NETWORK MANAGEMENT & INFORMATION SECURITY)

1st SEMESTER

Session 2020 - 2021

Mission of SCS&IT, DAVV

To produce world-class professionals who have excellent analytical skills, communication skills, team building spirit and ability to work in cross cultural environment.

To produce international quality IT professionals, who can independently design, develop and implement computer applications.

Professionals who dedicate themselves to mankind, who are environment conscious, follow social norms and ethics.

School of Computer Science & IT,
Devi Ahilya Vishwa Vidyalaya, Indore
www.scs.dauniv.ac.in

Course Name MTech (NM & IS) 1st Semester
Subject Code: CS-5615
Subject Name: Information Security

Aim of the Subject

The main aim of this course is to provide students with a background, foundation, and insight into the many dimensions of information security.

Objectives

1. To provide an introduction to the fundamental principles of cryptography and its applications on the network security domain.
2. . To study various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
3. To be familiar with cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel; verification of the authenticity of the source of a message.
4. To illustrate how network security and management mechanisms employ cryptography to prevent, detect, and mitigate security threats against the network

Learning Outcomes

1. To have a fundamental understanding of the objectives of cryptography and network security.
2. To become familiar with the cryptographic techniques that provides information and network security.
3. . To impart knowledge on Encryption techniques, Design Principles and Modes of operation.
4. To analyze a given system with respect to security of the system.
5. To understand the Key Management techniques and Number Theory.
6. To create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
7. To examine the issues and structure of Authentication Service and Electronic Mail Security.
7. To provide familiarity in Intrusion detection and Firewall Design Principles.

Unit 1

Computer Security Concepts, Introduction to Information Security, Confidentiality, Integrity, and Availability, Assets and Threats etc.

Unit 2

Basic Cryptographic Concepts, Symmetric Encryption Algorithms, Purpose of Cryptography, Data Encryption Standard (DES), Triple DES, Advanced Encryption Standard (AES) etc.

Unit 3

Public-Key Encryption, Introduction to Public-Key Cryptography, Public-Key Encryption Algorithms, RSA Public-Key Algorithm, Diffie-Hellman Algorithm etc.

Unit 4

Access Control Mechanisms, Authentication, Access Control and Authorization, Security Protocols and Solutions, Internet Protocol Security, Secure Sockets Layer, Pretty Good Privacy.

Unit 5

Firewalls, Intrusion Detection, and Intrusion Prevention, Security Protocols and Solutions, Firewall, Host- Based IDS vs. Network-Based IDS, Network Attacks and Defense.

Text Book(s)

1. Stallings William, Cryptography and Network Security: Principles and Practice, 6th Edition, Pearson/Prentice- Hall.
2. Atul Kahate, "Cryptography and Network Security", Second Edition.

Reference Material(s)

1. Mathew Bishop; Computer Security; Art and Science; Addison-Wisley Oct. 2007
2. Mathew Bishop; Introduction to computer Security; Addison-Wisley Oct 2004
3. Kaufman, Perlman and Speciner; "Network security"; Pearson Education 1995.

Course Name MTech (NM & IS) 1st Semester
Subject Code: CS-6220
Subject Name: Internet Programming Using Java

Aim of the Subject

To make students learn fundamental concept of coding and perform them practically and to develop problem-solving skills

Objectives

1.To make students learn the basics of coding
2.To develop concept in a logical and creative way.

Learning Outcomes

Description of knowledge to be acquired:
A student completing course unit 1 should :
1. Have an understanding of basics of coding with syntax.
2. To perform concepts practically including topics of core java.

A student completing course unit 2 should :
1.Have understanding of concepts logically.
2. Develop programming solving skills.
3.Have improvement of mathematical logics.
4.understand of concepts practically of inheritance ,exceptional handling, multithreading ,applets and Jdbc.

A student completing course unit 3 should :
1.Have understanding of fundamentals of HTTP and servlets.
2.Have understanding methods and to perform them practically.

A student completing course unit 4 should :
1.Have understanding of basics of Jsp
2.Have understanding of Jsp lifecycle and connection of Jsp with different database like oracle, ms-sql server and performing operations.

A student completing course unit 5 should :
1.Have understanding of basics of EJB and its types.
2.Have knowledge of creating and working with session bean.

Unit 1

Review of java concepts: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, control statements, looping, Method Call Stack and Activation Record, Argument Promotion and Casting, Scope of declaration and Method Overloading, String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer. Arrays: Declaring and Creating

Arrays, Enhanced for Statement, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments

Unit 2

Inheritance: Extending classes & related things. Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Multithreading: What are threads, The java thread model, Thread priorities, Thread life cycle, Thread Synchronization, Applets: Applet basics, Applet Architecture, Applet life cycle methods, Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC

Unit 3

Introduction to HTTP, web Server and application Servers, Installation of Application servers, Config files, Web.xml. Java Servlet, Servlet Development Process, Deployment Descriptors, Generic Servlet, Lifecycle of Servlet. Servlet Packages, Classes, Interfaces, and Methods, Handling Forms with Servlet, Various methods of Session Handling, various elements of deployment descriptors

Unit 4

JSP Basics: JSP lifecycle, Directives, scripting elements, standard actions, implicit objects. Connection of JSP and Servlet with different database viz. Oracle, MS-SQL Server, MySQL. java.sql Package. Querying a database, adding records, deleting records, modifying records, types of Statement. Separating Business Logic and Presentation Logic, Building and using JavaBean. Session handling in JSP, Types of errors and exceptions handling.

Unit 5

MVC Architecture Introduction to Remote Method Invocation, Introduction to Enterprise Java Bean, Types of EJB, Creating and working with Session Bean

Text Book(s)

1. Java 2: The Complete Reference by Herbert Schildt, Tata McGraw- Hill, 8th Edition, 2011.
2. K. Mukhar, “Beginning Java EE 5: From Novice to Professional”, Wrox Press.

Reference Material(s)

1. The Java Programming Language, Ken Arnold , James Gosling , David Holmes, 3rd Edition, Person Education, 2000.
2. Head First Java, Kathy Sierra, Bert Bates, O’Reilly Publication, 2nd Edition, 2005
3. M. Hall, L. Brown, “Core Servlets and Java Server Pages”, 2nd edition, Pearson Education

4. G. Franciscus, “Struts Recipes”, Manning Press
5. C. Bauer, G. King, “Hibernate in Action”, Manning Press
6. B. Basham, K. Sierra, B. Bates, “Head First Servlet and JSP”, 2nd Edition, O'Reilly Media.

Course Name MTech (NM & IS) 1st Semester
Subject Code: CS-6622
Subject Name: Advanced Computer Network

Aim of the Subject

This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks. Laboratory Work: consists of creating simulated networks and passing packets through them using differe

Objectives

1. . To study the problematic of service integration in TCP/ IP networks focusing on protocol design, implementation and performance issues.
2. To debate the current trends and leading research in the computer networking area.

Learning Outcomes

1. To identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality.
2. To understand the principles and functionality of mobile IP, explaining its concretization in IPv6; to understand the needs of optimization of the mobility mechanisms and description of some extensions that aim to reduce handover latency and requirements from terminals.
3. .To recognize the need for service integration and discuss how it can be accomplished.

Unit 1

Review of Basic Network Architectures: OSI reference model, TCP/IP reference model, ATM reference model; Applications (WWW, Audio/Video Streaming, Video conference, Networked Games, Client/Server); Traffic Characterization (CBR, VBR); Switching Paradigms; Multiplexing; Error Control; Flow Control, SONET, Optical Networks.

Unit 2

Local Area Network Technologies: Wired LANS: Ethernet Protocol, IEEE MAC Sublayer protocols - 802.3, 802 .4, 802.5 and their management, Fast Ethernet, Gigabit Ethernet, Wireless LANs, IEEE 802.11 Project, Bluetooth, Connecting LANs.

Unit 3

Internetworks: Host-to-Host Delivery, Addressing - classful and classless addressing, subnetting and supernetting. Internetworking: Interdomain Routing, Border Gateway Protocol version 4 , IPv 6 , Multicast Routing Protocols, Multi-Protocol Label Switching, Virtual Private Networks, High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet.

Unit 4

Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques for Web, Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

Unit 5

Applications and Other Networking Technologies: RTP, RTSP, SIP, Vo IP, Security Systems, SSH, PGP, TLS, IPSEC, DDoS Attack, Mitigation in Internet, Security in MPLS; Introduction to Cellular, Satellite and Ad hoc Networks.

Text Book(s)

1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Ed., Tata McGraw Hill.
2. 2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Ed., Morgan Kaufmann .

Reference Material(s)

1. Jean Walrand and Pravin Varaiya, High performance Communication Networking, 2nd Ed., Morgan Kaufmann, 1999.
2. Markus Hoffmann and Leland R. Beaumont, Content Networking: Architecture, Protocols, and Practice, Morgan Kaufmann, 2005.

Course Name MTech (NM & IS) 1st Semester
Subject Code: CS-6624
Subject Name: Network Management

Aim of the Subject

To familiarize the student with the design, analysis, operation and management of data communications networks.

Objectives

1. Provide understanding of the fundamental concepts of network management.
2. Build a theoretical foundation of Network Management Protocols among students.
3. . Provide the student with a working knowledge of the types of communications network management systems, their strengths andweaknesses in solving various network management problems.
4. Equip the students with an in-depth knowledge of how to install, maintain, and manage a Local Area Network, which helps the students to understand the actual working of computer network.

Learning Outcomes

1. Understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
2. In depth understanding of transport layer concepts and protocol design; including connection- oriented and connection-less models, techniques to provide reliable data delivery, and algorithms for congestion control and flow control.
3. In depth understanding of various network management standards and their perceptive.
4. Understand the SMTP protocol and its working in detail.
5. Understand the basic concepts of broadband network Telecommunication network and their management.
5 . Knowledge of Network Management Tools and Network Management Applications: Configuration management, Fault management, performance management, security management and accounting management.

Unit 1

Introduction: Computer Network, Goals and Applications, Data Communications and Network Management Overview : Communications protocols and Standards. Case Histories of Networking and Management, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

Fundamentals of computer network technology: Network Topology, LANs, Network node components Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology. Network Management Standards, Network Management Model, Organization Model, Information Model, Communication Model, ASN.1, Encoding Structure.

Unit 2

SNMPv1 Network Management: Managed network: Case Histories and Examples, The History of SNMP Management. The SNMP Model, The Organization Model, System Overview. The Information Model, The SNMP Communication Model, Functional Model.

SNMPv2 Management: Major Changes in SNMPv2 , SNMPv2 System Architecture, SNMPv2 Structure of Management Information. The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

Unit 3

SNMP Management-RMON: Introduction, RMON SMI and MIB, RMON1.

Broadband Network Management-ATM Networks: Broadband Networks and Services, ATM Technology, ATM Network Management.

Unit 4

Broadband Network Management: Broadband Access Networks and Technologies, HFC Technology, HFC Management, DSL Technology, ADSL Technology, ADSL Management.

Telecommunication Management Network: Introduction, Operations Systems, TMN conceptual Model, TMN Architecture, TMN Management Service Architecture, An integrated view of TMN.

Unit 5

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management. Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

Network Management Applications: Configuration management, Fault management, performance management. Event Correlation Techniques, security Management, Accounting management, Report Management, Policy Based Management Service Level Management.

Text Book(s)

• Mani Subrahmanian, Network Management: Principles and Practice, Pearson Education, 2nd Edition 2010.

Reference Material(s)

• Morris, Network management, Pearson Education.
• Mark Burges, Principles of Network System Administration, Wiley Dreamtech Publication.
• Paul, Distributed Network Management, John Wiley Publication.
• Andrew S. Tanenbaum, Computer Networks, Addison-Wesley, 4th Edition.
• B.A. Forouzan, Data Communications and Networking, McGraw-Hill.
• W. Stallings, Data and Computer Communications, Prentice-Hall, 5th Ed., 1997.
• James F. Kurose and Keith W. Rose, Computer Networking, Pearson Education, Third Edition, 2005.

CS-5615: Information Security

List of Assignment

1. Study of Network Security fundamentals - Ethical Hacking, Social Engineering practices.

2. Study of System threat attacks - Denial of Services.

3. Study of Sniffing and Spoofing attacks.

4. Study of Techniques uses for Web Based Password Capturing.

5. Study of Different attacks causes by Virus and Trojans.

6. Study of Anti-Intrusion Technique – Honey pot.

7. Study of Symmetric Encryption Scheme – RC4.

8. Study of IP based Authentication.

Programming Assignment

LIST OF EXPERIMENTS:

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
a) Caesar Cipher
b) Playfair Cipher
c) Hill Cipher
d) Rail fence – row & Column Transformation

2. Implement the following algorithms
a) DES
b) RSA Algorithm
c) Diffiee-Hellman
d) MD5

3. Implement the Signature Scheme - Digital Signature Standard

4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures.

5. Setup a honey pot and monitor the honeypot on network.

6. Installation of rootkits and study about the variety of options

7. Perform wireless audit on an access point or a router and decrypt WEP and WPA. (Net Stumbler)

8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

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CS-6220: Internet Programming using Java

M.Tech.(CS) & (NM)

Assignment

Note :

Study the uploaded PDF and PPT that we had discussed earlier in class ,based on this study and prepare assignment in word file .

Q1. Write a java program that has a method for the calculation of fourth power of 2.

Q 2. Write a java program that will accept command line argument and print the same.

Q 3. Write a java program that has a method for initialization of variable to 10 and 20 &another method display the same.

Q 4. Write a java program that prints the different time zones available with the time zones class.

Q 5. Write a java program that prints details about current date, time, month, year, day of the month, day of the week.

Q 6. Write a java program that will display the message "weight of bundle -5 kgs" in a constructor &display the weight in kilograms & grams.

Q 7. How to determine upper bound for two dimensional array in java.

Q 8. Write a java program to read 10 numbers and store in array .list out duplicate numbers, number of times duplication occurs.

Assignment 1

MTech (NM & IS) 1st Semester

Unit-1

CS-6622 Advanced Computer Network

1. Compare TCP/IP with OSI reference model with the functionality of each layer.
2. Why trailing bits are added at the end of frame why not in the header?
3. Why error control and flow control mechanism applied at transport layer if they are already applied at data link layer?
4. What are the needs of packet switching? Explain working of packet switching and also methods of packet switching.
5. Compare datagram and packet switching in terms of efficiency, delay etc.
6. Explain the various structures of switch. What is cross point in crossbar switch?
7. There are no sequence number in frame relay. Why?
8. Why is frame relay a better solution for connecting LANs than T-1 lines?
9. Compare SVC and PVC.
10. Why is multiplexing is more efficient if all the data units are of same size?
11. What is the relationship between TPs, VP, and VCs.
12. How is an ATM virtual connection identified?
13. Explain the layers of ATM reference model.