

**BHARATHIAR UNIVERSITY: COIMBATORE-641 046****B.Sc. CS**(For the students admitted from the academic year **2011-2012** and onwards)**SCHEME OF EXAMINATION - CBCS PATTERN**

Part	Study Component s	Course title	Ins. hrs/ week	Examinations				Credit
				Dur.Hrs	CIA	Marks	Total Marks	
	<b>Semester I</b>							
I	Language – I		6	3	25	75	100	4
II	English – I		6	3	25	75	100	4
III	Core 1: Computing fundamentals and C Programming		4	3	25	75	100	4
III	Core 2: Digital Fundamentals and Architecture		4	3	25	75	100	4
III	Core Lab 1: Programming Lab - C		3	3	40	60	100	4
III	Allied 1: Mathematical Structures for Computer Science		5	3	25	75	100	4
IV	Environmental Studies #		2	3	-	50	50	2
	<b>Semester II</b>							
I	Language – II		6	3	25	75	100	4
II	English – II		6	3	25	75	100	4
III	Core 3: COBOL Programming		5	3	25	75	100	4
III	Core Lab 2: Programming Lab – COBOL		4	3	40	60	100	4
III	Core Lab 3: Programming Lab –Internet Basics		2	3	20	30	50	2
III	Allied 2: Discrete Mathematics		5	3	25	75	100	4
IV	Value Education – Human Rights #		2	3	-	50	50	2
	<b>Semester III</b>							
III	Core 4: Data Structures		6	3	25	75	100	4
III	Core 5: C++ Programming		6	3	25	75	100	4
III	Core Lab 3: Programming Lab - C++		5	3	40	60	100	4
III	Allied 3: Computer Based Optimization Techniques		6	3	25	75	100	4
IV	Skill based Subject I – Software Engineering and Software Project Management*		5	3	20	55	75	3
IV	Tamil @ / Advanced Tamil# (OR) Non-major elective-1 (Yoga for Human Excellence)# / Women’s Rights#		2	3	-	50	50	2
	<b>Semester IV</b>							
III	Core 6: System Software and Operating System		6	3	25	75	100	4
III	Core 7: Java Programming		6	3	25	75	100	4

III	Core Lab 5: : Programming Lab - JAVA	6	3	40	60	100	4
III	Allied 4: Business Accounting	6	3	25	75	100	4
IV	Skill based Subject 2 –(lab) Software Project Management- Lab*	4	3	30	45	75	3
IV	Tamil @ /Advanced Tamil # (OR) Non-major elective -II (General Awareness #)	2	3	-	50	50	2
	<b>Semester V</b>						
III	Core 8: RDBMS & ORACLE	5	3	25	75	100	4
III	Core 9: Visual Programming – Visual Basic & Visual C++	5	3	25	75	100	4
III	Core 10: : Project Work Lab %%	5	3	-	50	50	2
III	Core Lab 5: Visual Programming. – V.B.,V C++ & ORACLE	6	3	40	60	100	4
	Elective I E-Learning*/Computer Networks/ Organizational Behavior*	5	3	25	75	100	4
IV	Skill based Subject 3- Software Testing	4	3	20	55	75	3
	<b>Semester VI</b>						
III	Core 11: Graphics & Multimedia	5	3	25	75	100	4
III	Core 12: Project Work Lab %%	5	3	-	150	150	6
III	Core Lab 6: Programming Lab - Graphics & Multimedia	6	3	40	60	100	4
III	Elective II: Network Security and Cryptography/ Artificial Intelligence and Expert Systems / Web Technology	5	3	25	75	100	4
III	Elective III: Data Mining*/ Open source software*/Mastering LAN & Trouble	5	3	25	75	100	4
IV	Skill Based Subject 4 (lab) - Software Testing Lab	4	3	30	45	75	3
V	Extension Activities @	-	-	50	-	50	2
	Total					3500	140

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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%% In lieu of theory paper – see **Project Work Guidelines**

&& Please see Annexure for list of Allied, Elective and Skill Based Subjects

**BHARATHIAR UNIVERSITY: COIMBATORE-641 046**  
**B.Sc. CS/IT/CT/SS/MM/CSA &BCA**  
 (For the students admitted from the academic year **2011-2012** and onwards)  
**CBCS PATTERN**

**CORE SUBJECTS**

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>I</b>
Subject	<b>CORE 1 : Computing Fundamentals and C Programming</b>

**Subject Description:** This subject deals with the Computer fundamentals and the concepts of C programming language.

**Goal:** To learn about the Computer fundamentals and the C programming language concepts

**Objective:** On successful completion of this subject the students have the programming ability in C Language

**UNIT – I:** Fundamentals of Computers : Introduction – History of Computers-Generations of Computers- Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software- Overview of Operating System- Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C.

**UNIT – II:** Overview of C - Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity - Mathematical functions - Reading & Writing a character - Formatted input and output.

**UNIT – III:** Decision Making and Branching : Introduction – If , If...Else, nesting of If ...Else statements- Else If ladder – The Switch statement, The ?: Operator – The Goto Statement. Decision Making and Looping : Introduction- The While statement- the do statement – the for statement-jumps in loops. Arrays – Character Arrays and Strings

**UNIT – IV:** User-Defined Functions : Introduction – Need and Elements of User-Defined Functions- Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables- Multi file Programs . Structures and Unions

**UNIT V: Pointers:** Introduction-Understanding pointers-Accessing the address of a variable-Declaration and Initialization of pointer Variable – Accessing a variable through its pointer-Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers and Strings – Array of pointers – Pointers as Function Arguments-Functions returning pointers – Pointers to Functions – Pointers and Structures. File Management in C.

**TEXT BOOK:**

1.E Balagurusamy: –COMPUTING FUNDAMENTALS & C PROGRAMMING|| – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.

**REFERENCE BOOK:**

1. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
2. Henry Mullish & Huubert L.Cooper: The Sprit of C, Jaico Pub. House, 1996.

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>I</b>
Subject	<b>CORE 2 : DIGITAL FUNDAMENTALS AND ARCHITECTURE</b>

**Subject Description:** This subject deals with fundamentals of digital computers, Microprocessors and System architecture.

**Goal:** To learn about Computer Fundamentals and its Architecture.

**Objective:** On successful completion of this subject the students should have Knowledge on Digital circuits, Microprocessor architecture, and Interfacing of various components.

**UNIT-I:** Number System and Binary Codes: Decimal, Binary, Octal, Hexadecimal – Binary addition, Multiplication, Division – Floating point representation, Complements, BCD, Excess3, Gray Code. Arithmetic Circuits: Half adder, Full adder, Parallel binary adder, BCD adder, Half subtractor, Full subtractor, Parallel binary subtractor - Digital Logic: the Basic Gates – NOR, NAND, XOR Gates.

**UNIT-II:** Combinational Logic Circuits: Boolean algebra – Karnaugh map – Canonical form 1 – Construction and properties – Implicants – Don't care combinations - Product of sum, Sum of products, simplifications. Sequential circuits: Flip-Flops: RS, D, JK, and T - Multiplexers – Demultiplexers – Decoder Encoder – shift registers-Counters.

**UNIT-III:** Input – Output Organization: Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface. Asynchronous data transfer: Strobe Control and Handshaking – Priority Interrupt: Daisy- Chaining Priority, Parallel Priority Interrupt. Direct Memory Access: DMA Controller, DMA Transfer. Input – Output Processor: CPU-IOP Communication.

**UNIT-IV:** Memory Organization: Memory Hierarchy – Main Memory- Associative memory: Hardware Organization, Match Logic, Read Operation, Write Operation. Cache Memory: Associative, Direct, Set-associative Mapping – Writing into Cache Initialization. Virtual Memory: Address Space and Memory Space, Address Mapping Using Pages, Associative Memory, Page Table, Page Replacement.

**UNIT-V:** CASE STUDY: Pin out diagram, Architecture, Organization and addressing modes of 80286-80386-80486-Introduction to microcontrollers.

**TEXT BOOKS:**

1. Digital principles and applications, Albert Paul Malvino, Donald P Leach , TMH,1996.
- 2.COMPUTER SYSTEM ARCHITECTURE -M. Morris Mano , PHI.
3. MICROPROCESSORS AND ITS APPLICATIONS-RAMESH S.GOANKAR

**REFERENCE BOOKS:**

1. DIGITAL ELECTRONICS CIRCUITS AND SYSTEMS - V.K. Puri , TMH.
2. COMPUTER ARCHITECTURE , M. Carter , Schaum's outline series, TMH.

Course	<b>(BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>I</b>
Subject	<b>CORE LAB 1 : PRACTICAL LIST- PROGRAMMING LAB – C</b>

1. Write a C program to find the sum, average, standard deviation for a given set of numbers.
2. Write a C program to generate -n prime numbers.
3. Write a C program to generate Fibonacci series.
4. Write a C program to print magic square of order n where  $n > 3$  and n is odd.
5. Write a C program to sort the given set of numbers in ascending order.
6. Write a C program to check whether the given string is a palindrome or not using pointers.
7. Write a C program to count the number of Vowels in the given sentence.
8. Write a C program to find the factorial of a given number using recursive function.
9. Write a C program to print the student's Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.
10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.
11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file.
12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i)no of chars ii) no. of words and iii) no. of lines.

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>I</b>
Subject	<b>Allied 1: MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE</b>

**Subject Description:** This subject deals with mathematical concepts like Matrices, Numerical analysis and Statistical methods for computer science and applications.

**Goal:** To learn about the mathematical structures for computer based applications

**Objective:** On successful completion of this subject the students should have :

- Understanding the concepts of mathematics
- Learning applications of statistical and numerical methods for Computer Science.

**UNIT – I:** Matrices – Introduction – Determination – Inverse of a matrix – Rank of a Matrix – Eigen value Problems

**UNIT – II:** System of Simultaneous Linear algebraic Equation – Gauss elimination, Gauss Jordan, Gauss Seidal methods. The solution of Numerical Algebraic & Transcendental equation – Bisection method – Newton – Rapson method – false position method.

**UNIT – III:** Numerical Differentiations – Newton's forward Difference - Backward Difference – Startling formula Numerical Integration – Trapezoidal Rule & Simpson's rule Numerical solutions of ordering differential Equations – Taylor series & Runge kutta method

**UNIT – IV:** Measures of central tendency – Mean Median and Mode – Relationship among mean media and mode. Measures of dispersion – Range, quartile deviation, mean deviation and Standard deviation

**UNIT – V:** Regression and Correlation – Types of relationship – Linear regression – Correlation – Coefficient of correlation – Regression equation of variables – Discrete Probability distribution – Uniform, Binomial & poisson Distribution

#### **TEXT BOOKS:**

1. Engineering Mathematics Volume II – Dr M.K. Venkataraman – NPC (Unit I)
2. Numerical Methods in science & Engineering - M.K. Venkataraman – NPC , Revised Edition -2005 (Unit II & III)
3. Business Statistics - S.P. Gupta & M.P. Gupta Sultan Chand and Sons (Unit IV & V)

#### **REFERENCE BOOKS:**

1. Numerical methods – E. Balagurusamy Tata MC Graw Hill.
2. Fundamental of Mathematical statistics S C Gupta, V. K. Kapoor Sultan Chand and Sons

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>II</b>
Subject	<b>CORE 3 : COBOL PROGRAMMING</b>

**Subject Description:** This subject deals with the programming concepts on business applications using COBOL language.

**Goal:** To learn about COBOL programming language for business problems

**Objective:** On successful completion of this subject the students should have :

- Writing programs for business applications
- Concepts of file handling in programming languages

**UNIT – I:** Introduction to COBOL: COBOL words - Literals - Structure of COBOL Program - COBOL Coding Sheet-IDENTIFICATION DIVISION- ENVIRONMENT DIVISION – DATA DIVISION – Editing and Non-editing Picture Clauses – Level Numbers – VALUE and FILLER Clause.

**UNIT – II:** PROCEDURE DIVISION – Data Movement Verb – Arithmetic Verbs : Add, Subtract, Multiply, Divide, Compute – Input/Output Statement: Accept, Display Control Verbs: GOTO – GOTO Depending on – Stop Run – CORRESPONDING Option - ROUNDED option - ON SIZE ERROR option - Simple Programs Using Above Verbs.

**UNIT – III:** Conditional Statements: If Statement – Nested if statement – Sign Condition – Class Condition- Condition Name – Compound Condition- PERFORM Statements, More about DATA Division: RENAMES-REDEFINES – Simple Programs Using the above Verbs.

**UNIT – IV:** Files in COBOL: Sequential – Relative – Indexed Sequential - Random files – File description and Record description entries - Input/Output Verbs: Open, read, write, rewrite, Close, Delete – Sort Verb – Simple Programs using above Verbs.

**UNIT – V:** Table Handling: Occurs Clause – Two and Multi-Dimensional Tables – Occurs Indexed By Clause – SET Verb – START and SEARCH Verb – Random Files-Keys & Their Importance – INVALID KEY Clause – SCREEN SECTION - Simple Programs using above Verbs.

#### **TEXT BOOKS:**

1. COBOL PROGRAMMING, M.K. R OY & D.GHOSH DASTIDAR, TATA Mc.GRAW HILL, SECOND EDITION - 1998.

#### **REFERENCE BOOKS:**

1. COBOL programming – V. Rajaraman, PHI Pub.
2. Introduction To Cobol Programmin g – Author Dr. R. Krishnamoorthy, JJ Publications.
3. Structured COBOL – Welburn, Tata McGrawhill, 4 th Edition.

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>II</b>
Subject	<b>CORE LAB II : PRACTICAL LIST- PROGRAMMING LAB – COBOL</b>

1. Write a COBOL program to find the sum of individual digits of a 10-digit number until a single digit is produced.
2. Write a COBOL program to accept the inputs student Name, Marks for five subjects and declare the result as PASS, if the student gets minimum 40 in each subject otherwise declare the result as FAIL.
3. Write a COBOL program to accept a date (DDMMYY) and display the result in the following specified format: For eg : 030498 as 3<sup>rd</sup> APR 1998 [Use REDEFINES Clause].
4. Write a COBOL program to display the given three digit number into words using OCCURS clause For eg : 342 THREE HUNDRED AND FORTY TWO
5. Write a COBOL program to create a student data file using the following fields: ROLL-NO, NAME, AGE, SEX, YEAR-IN-COLLEGE, MARKS for five subjects.
6. Write a COBOL program to create the following two files using the student data file (Created by program 5) .  
FILE 1: List of male student who are studying third year of the College.  
FILE 2: List of female students who are studying first year of the College. [Use MOVE.....CORRESPONDING Option]

7. Write a COBOL program to sort the student data file (created by program-5) in the ascending order of the fields SEX, Year-in-college and ROLL-NO. [Use SORT Verb ].
8. Write a COBOL program to create an Employee file for the employees of an organization using the following fields :  
EMP-NO , NAME , DOB, SEX, BASIC-PAY, DESIGNATION.
9. Write a COBOL program to update the new BASIC-PAY of each employee in the Employee data file (created in program 8) by incrementing 25% of BASIC -PAY.
10. Write a COBOL program to find the number of male employees whose BASIC-PAY > 4000 and the number of female employees whose BASIC-PAY < 3000 using the employee data file (created by program 8)
11. Write a COBOL program to create an inventory data file by using the following fields :  
ITEM-CODE, DESCRIPTION, OPEN-STOCK, PURCHASES, SALES, SAFETY-LEVEL, CLOSE-STOCK.
12. Write a COBOL program to prepare RE- ORDER LEVEL STATEMENT by using the inventory data file (crated by program 11) if the CLOSE-STOCK is less than SAFETY-LEVEL :

A.B.C.& COMPANY, CHENNAI-600006  
RE-ORDER LEVEL STATEMENT

ITEM-CODE	DESCRIPTION	SAFETY-LEVEL	CLOSE-STOCK



Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>II</b>
Subject	<b>CORE LAB III : PRACTICAL LIST- Internet Basics</b>

1. To create an email-id.
2. To compose and send a mail.
3. To forward a mail and to reply for a mail.
4. To send a mail with an attachment.
5. To download the attached document of a mail received.
6. To send a mail to a large number of recipients using cc and bcc options.
7. To search a thing using a search engine.
8. To open and read newspaper sites, TV program schedules using Internet.
9. To verify a university /college details by opening their websites.
10. To upload your resume with any one job portal.

Course	<b>BSc CS, IT, CT, SS, CSA, MM &amp; B.C.A (Regular)</b>
Effective from	<b>2011-2012 and Onwards</b>
Semester	<b>II</b>
Subject	<b>ALLIED 2: DISCRETE MATHEMATICS</b>

**Subject Description:** This subject deals with discrete structures like set theory, mathematical logic, relations, languages, graphs and trees.

**Goal:** To learn about the discrete structures for computer based applications.

**Objective:** On successful completion of this subject the students should have:

- Understanding the concepts of discrete mathematics
- Learning applications of discrete structures in Computer Science.

**UNIT – I:** Set theory-Introduction-Set & its Elements-Set Description-Types of sets- Venn-Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-minsets- Algebra of sets and Duality-Inclusion and Exclusion principle

**UNIT – II:** Mathematical logic – Introduction- propositional calculus –Basic logical operations- Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.

**UNIT – III:** Relations – Binary Relations – Set operation on relations-Types of Relations – Partial order relation – Equivalence relation – Composition of relations – Functions – Types of functions – Invertible functions – Composition of functions.

**UNIT – IV:** Languages – Operations on languages – Regular Expressions and regular languages – Grammar – Types of grammars – Finite state machine – Finite – State automata

**UNIT – V:** Graph Theory – Basic terminology – paths, cycle & Connectivity – Sub

graphs

– Types of graphs – Representation of graphs in computer memory - Trees – Properties of trees – Binary trees – traversing Binary trees – Computer Representation of general trees. **TEXT BOOKS:**

1. Discrete Mathematics – J.K. Sharma Second Edition – 2005 , Macmillan India Ltd.

(UNIT I TO V)

## **REFERENCE**

### **BOOKS:**

1. Discrete Mathematics Structures with Applications to computer science - J. P Tremblay R Manohar – Mc Graw Hill International Edition

3. Discrete Mathematics – Dr M. K. Venketaramen, Dr N.Sridharan, N.Chandarasekaran The National publishing Company Chennai.

## **Semester III - Core 4 :Subject Title: DATA STRUCTURES**

### **UNIT I**

Introduction: Introduction of Algorithms, Analysing Algorithms. Arrays: Sparse Matrices - Representation of Arrays. Stacks and Queues. Fundamentals - Evaluation of Expression Infix to Postfix Conversion - Multiple Stacks and Queues

### **UNIT II**

Linked List: Singly Linked List - Linked Stacks and Queues - Polynomial Addition - More on Linked Lists - Sparse Matrices - Doubly Linked List and Dynamic - Storage Management - Garbage Collection and Compaction.

### **UNIT III**

Trees: Basic Terminology - Binary Trees - Binary Tree Representations - Binary Trees - Traversal - More on Binary Trees - Threaded Binary Trees - Binary Tree Representation of Trees - Council Binary Trees. Graphs: Terminology and Representations - Traversals, Connected Components and Spanning Trees Shortest Paths and Transitive Closure

### **UNIT IV**

External Sorting: Storage Devices -Sorting with Disks: K-Way Merging - Sorting with Tapes Symbol Tables: Static Tree Tables - Dynamic Tree Tables - Hash Tables: Hashing Functions - Overflow Handling.

### **UNIT V**

Internal Sorting: Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort - Shell Sort - Sorting on Several Keys. Files: Files, Queries and Sequential organizations - Index Techniques -File Organizations.

### **TEXT BOOKS**

1. Ellis Horowitz, Sartaj Shani, Data and File Structures Galgotia Publication.

2. Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran, "Computer Algorithms Galgotia Publication.

## SEMESTER III CORE 5 : C++ PROGRAMMING

**Subject Description:** This subject deals with Object-oriented programming concepts like Abstraction, Encapsulation, Inheritance and Polymorphism.

**Goal:** Knowledge on Object-oriented concept and programming with C++.

**Objective:** To inculcate knowledge on Object-oriented programming concepts using C++.

**UNIT-I:** Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If .. else ,jump, goto, break, continue, Switch case statements - Loops in C++ : For,While, Do - Functions in C++ - Inline functions – Function Overloading.

**UNIT-II :** Classes and Objects : Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

### UNIT-III

**Operator Overloading:** Overloading unary, binary operators – Overloading Friend functions – type conversion – **Inheritance:** Types of Inheritance – Single, Multilevel, Multiple, Hierarchical, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

### UNIT-IV:

**Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding , Polymorphism and Virtual Functions.**

### UNIT-V:

**Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .**

### *TEXT BOOKS :*

1. Ashok N Kamthane , OBJECT-ORIENTED PROGRAMMING WITH ANSI AND TURBOC C++, Pearson Education publication. 2003.

### *REFERENCE BOOKS:*

1.E. Balagurusamy, OBJECT-ORIENTED PROGRAMMING WITH C++, Tata McGrawhill Publication, 1998.

2. Maria Litvin & Gray Litvin , C++ for you, Vikas publication, 2002.

3. John R Hubbard, Programming with C, 2<sup>nd</sup> Edition, TMH publication, 2002.

## **CORE LAB - 4 : PROGRAMMING LAB C++**

1. Write a C++ Program to create a class to implement the Data Structure STACK.

Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..

2. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD(), SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
3. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.
4. Write a C++ Program to create a class FLOAT that contains one float data member.  
Overload all the four Arithmetic operators so that they operate on the object FLOAT.
5. Write a C++ Program to create a class STRING. Write a Member Function to initialize ,get and display strings. Overload the Operator ++ to Concatenate two Strings, == to Compare two strings
6. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E\_Number, E\_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.
7. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate\_Area() and Calculate\_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGLE from class Shape and Calculate Area and Perimeter of each class separately and display the result.
8. Write a C++ Program to create two classes each class consists of two private variables, a integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.
9. Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.
10. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
11. Write a C++ Program to create a File and to display the contents of that file with line numbers.
12. Write a C++ Program to merge two files into a single file.

## **ALLIED-3 – CS/BCA :COMPUTER BASED OPTIMIZATION TECHNIQUES**

**Subject Description:** This subject deals various optimization techniques for linear programming, Transportation, Assignment Problems, Game theory, PERT and CPM.

**Goal:** To learn about the managerial concepts like decision making, optimization,

etc.

**Objective:** On successful completion of this subject the students should have:

- Understanding various mathematical applications in industries.
- Decision making for real time environment.

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**UNIT-I:** Linear Programming - Mathematical Model assumption of linear Programming – Graphical method - Principles of Simplex method, Big-M Method ,Duality, Dual simplex method.

**UNIT-II:** Transportation and assignment problem - Integer Programming Branch and Round

Techniques - Assignment and Traveling Salesman Problem.

**UNIT-III:** Game Theory - Concept of Pure and Mixed Strategies – Solving 2 x 2 matrix with and without saddle point - n x 2 - 2 x m games. Replacement models - Elementary replacement models - present value - rate of return - depreciation - Individual replacement – Group replacement.

**UNIT-IV:** (*Derivations not included*) Queuing Theory - definition of waiting line model - Queue discipline - traffic intensity - poison arrival – Birth death process - Problem from single server: finite and infinite population model – Problems from multi server: finite and infinite population model.

**UNIT-V:** PERT & CPM - Network representation - backward pass - Forward pass - computation - Pert Network - Probability factor – updating and Crashing.

### **TEXT**

#### **BOOKS**

1. **OPERATIONS RESEARCH** - Manmohan, P.K. Gupta, Kanthiswarup, S. CHAND & SONS - 1997.

### **REFERENCE**

#### **BOOKS**

1. **OPERATIONS RESEARCH** - **Hamdy A Taha**, Pearson Education, 7<sup>th</sup> edition, 2002
2. **PROBLEMS IN OPERATIONS RESEARCH** – **P.K. Gupta, D.S. Hira, S. Chand** Pub

## **Skill 1- SOFTWARE ENGINEERING & SOFTWARE PROJECT MANAGEMENT**

### **UNIT – I:**

Software Engineering: A Layered Technology – Software Process – Software Process Models – The Prototyping. Requirement Engineering– Software prototyping - Elements of analysis model – Data modeling – Functional modeling and information flow.

### **UNIT – II:**

Software design and Software engineering – The Design process – Design principles – Design concepts – Effective modular design –Software Architecture.

#### UNIT – III:

Software testing fundamentals – Test Case Design - White box testing – Basis path testing – Control structure testing – Black box testing. Unit testing – Validation testing – System testing.

#### UNIT – IV:

Software Configuration Management: Definitions and terminology – processes and activities. Software Quality assurance: Definitions – Quality control and Quality assurance – Organization of Structures. Risk Management: Risk Identification – quantification - Monitoring  
- Mitigation. Software requirements gathering: Steps to be followed – Outputs and Quality Records - Skill sets required – Challenges.

#### UNIT – V:

Estimation: What is Estimation? – When and Why? – Three phases of Estimation – Estimation methodology – Formal models of Size Estimation. Design and Development phases: Reusability - Technology choices – Standards – Portability -User interface issues – Testability - The Effect of Internet on Project Management.

#### TEXT BOOKS:

1. Roger S. Pressman: Software Engineering, Tata McGraw Hill, V Edition.
2. Gopalaswamy Ramesh, Managing Global Software Projects, Tata McGraw Hill, New Delhi, 2002.

#### REFERENCE BOOKS:

1. Watts S Humphrey: A Discipline for Software Engineering, Pearson Education, 2001.
2. Bob Hughes and Mike Cotterell, Software Project Management, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2002.

### **CORE-6: SYSTEM SOFTWARE AND OPERATING SYSTEM**

Subject Description: It deals Fundamentals of System Software and Resources of Operating System.

Goal: Knowledge on various System Software and Operating System concepts.

Objective: Enable the student to get sufficient knowledge on various system resources.

UNIT- I: Introduction –System Software and machine architecture-Assemblers-Basic assembler functions - Machine dependent features-program relocation-Machine independent features – literals - symbol defining statements-expressions-program blocks-control sections and program linking - Assembler design options-one pass assemblers-multi pass assemblers.

Loader and Linkers: Basic Loader Functions - Machine dependent loader features – relocation – program – linking - Machine independent loader features - Automatic Library search - Loader options - Loader design options - linkage editor - dynamic linking - Bootstrap loader.

UNIT- II: Macroprocessor: Basic macroprocessor functions - Machine independent macroprocessor features - concatenation of macro parameter macro processor design options-recursive macro expansion - general purpose macro processor - macro processing within language translators. Text Editors: Overview of editing

process - user interface - editor structure.

UNIT-III: Machine dependent compiler features - Intermediate form of the program- Machine dependent code optimization-machine independent compiler features- Compiler design options-division into passes-interpreters-p –code compilers-compiler-compilers.

UNIT IV: Introduction: Definition of DOS – History of DOS – Definition Of Process - Process states - process states transition – Interrupt processing – interrupt classes - Storage Management Real Storage: Real storage management strategies – Contiguous versus Non-contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming.

Virtual Storage: Virtual storage management strategies – Page replacement strategies – Working sets – Demand paging – page size.

UNIT V: Processor Management Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling - Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization –

File and Database Systems: File System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.

#### TEXT BOOK:

1. Leland –L-Beck, –System Software-An Introduction to Systems Programming, Pearson Education Publishers, Third Edition-2003.
2. H. M Deitel , – Operating Systems – , 2<sup>nd</sup> Edition, Perason Education Publication,2003.

#### REFERENCE BOOKS :

1. Achyut s Godbole , – Operating Systems, TMH Publications , 2002
2. John J. Donovan , –Systems Programming II , TMH Publications , 1991
3. D.M. Dhamdhrer, –Systems Programming and Operating Systems –, 2<sup>nd</sup> Revised Edition.

### **CORE-7 : JAVA PROGRAMMING**

**Subject Description:** This subject deals with Java Programming concepts. **Goal:** Enable to create wide range of Applications and Applets using Java. **Objective:** To inculcate knowledge on Java Programming concepts.

UNIT-I: Fundamentals of Object-Oriented Programming: Object-Oriented Paradigm – Basic Concepts of Object-Oriented Programming – Benefits of Object-Oriented Programming – Application of Object-Oriented Programming. Java Evolution: History – Features – How Java differs from C and C++ – Java and Internet – Java and www –Web Browsers. Overview of Java: simple Java program – Structure – Java Tokens – Statements – Java Virtual Machine.

UNIT-II: Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if ..else, nested if, switch, ? : Operator - Decision Making and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.

UNIT-III: Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting Classes together – Multithreaded Programming.

UNIT-IV: Managing Errors and Exceptions – Applet Programming – Graphics Programming.

UNIT-V: Managing Input / Output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.

*TEXTBOOKS:*

1. PROGRAMMING WITH JAVA – A PRIMER - E. Balagurusamy, 3<sup>rd</sup> Edition, TMH.

*REFERENCE BOOKS:*

1. THE COMPLETE REFERENCE JAVA 2 - Patrick Naughton & Hebert Schildt, 3<sup>rd</sup> ed, TMH
2. PROGRAMMING WITH JAVA – John R. Hubbard, 2<sup>nd</sup> Edition, TMH.

### **CORE LAB-5 : PROGRAMMING LAB - JAVA**

1. Write a Java Applications to extract a portion of a character string and print the extracted string.
2. Write a Java Program to implement the concept of multiple inheritance using Interfaces.
3. Write a Java Program to create an Exception called payout-of-bounds and throw the exception.
4. Write a Java Program to implement the concept of multithreading with the use of any three multiplication tables and assign three different priorities to them.
5. Write a Java Program to draw several shapes in the created windows.
6. Write a Java Program to create a frame with four text fields name, street, city and pin code with suitable tables. Also add a button called –my details!, When the button is clicked its corresponding values are to be appeared in the text fields.
7. Write a Java Program to demonstrate the Multiple Selection List-box.
8. Write a Java Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address
9. Write a Java Program to create Menu Bars and pull down menus
10. Write a Java Program to create frames which respond to the mouse clicks. For each events with mouse such as mouse up, mouse down, etc., the corresponding message to be displayed.
11. Write a Java Program to draw circle, square, ellipse and rectangle at the mouse click positions.
12. Write a Java Program which open an existing file and append text to that file.



## ALLIED – 4 : CS/BCA : BUSINESS ACCOUNTING

**Goal:** To enable the students to learn principles and concepts of Accountancy.

**Objective:** On successful completion of this course, the student should have understood

- Concepts and conventions of Accounting.
- Basic Accounting framework

### UNIT –I

Fundamentals of Book Keeping – Accounting Concepts and Conventions – Journal – Ledger – Subsidiary books – Trial balance.

### UNIT – II

Final accounts of a sole trader with adjustments – Errors and rectification

### UNIT – III

Bill of exchange- Accommodation bills – Average due date – Account current.

### UNIT – IV

Accounting for consignments and Joint ventures

### UNIT – V

Bank Reconciliation statement – Receipts and Payments and income and expenditure account and Balance sheet – Accounts of professionals.

**Note :** Distribution of Marks between problems and theory shall be 80% and 20%.

### BOOKS FOR REFERENCE

1. N.Vinayakam, P.L.Mani, K.L.Nagarajan – *Principles of Accountancy* – S.Chand & Company Ltd.,
2. T.S.Grewal – *Introduction to Accountancy*- S.Chand & Company Ltd.,
3. R.L.Gupta, V.K.Gupta, M.C.Shukla – *Financial Accounting* – Sultanchand & sons
4. T.S.Grewal, S.C.Gupta, S.P.Jain – *Advanced Accountancy*- Sultanchand & sons
5. K.L.Narang, S.N.Maheswari - *Advanced Accountancy*-Kalyani publishers
6. S.K.Maheswari, T.S.Reddy - *Advanced Accountancy*-Vikas publishers
7. A.Murthy -*Financial Accounting* – Margham Publishers
8. P.C.Tulsian - *Advanced Accountancy* – Tata McGraw Hill Companies.
9. A.Mukherjee, M.Hanif – *Modern Accountancy. Vol.1*- Tata McGraw Hill Companies

### SKILL2 - CS :SPM LAB

1. Preparation of Project Management Plan.
2. Using any of the CASE tools, Practice requirement analysis and specification for different firms.
3. Case study of cost estimation models.
4. Practice object oriented design principles for implementation.
5. Practice function oriented design.
6. Practice creating software documentation for the Analysis phase of software development life cycle for a real time application.
7. Practice creating software documentation for the Development phase of software development life cycle for a real time application.
8. Practice creating software documentation for the Implementation phase of software development life cycle for a real time application.
9. Practice creating software documentation for the Testing phase of software development life cycle for a real time application.

10. Simulate a tool for path testing principles.
11. Simulate a tool for testing based on control structures.
12. Simulate a tool that reflects black box testing concepts

## **CORE-8: RDBMS & ORACLE**

**Subject Description:** This subject deals with RDBMS concepts using Oracle SQL and PL/SQL.

**Goal:** Knowledge on Oracle Programming techniques.

**Objective:** To inculcate knowledge on RDBMS concepts and Programming with Oracle.

**UNIT-I: Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design– Normal forms – Dependency Diagrams – De-normalization – Another Example of Normalization.**

**UNIT-II: Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL \*Plus Environment – SQL – Logging into SQL \*Plus - SQL \*Plus Commands – Errors & Help – Alternate Text Editors - SQL \*Plus Worksheet - iSQL \*Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.**

**UNIT-III: Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.**

**UNIT-IV: PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.**

**UNIT-V: PL/SQL Composite Data Types: Records – Tables – arrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.**

### **TEXTBOOKS:**

1. DATABASE SYSTEMS USING ORACLE – Nilesh Shah, 2<sup>nd</sup> edition, PHI.  
(UNIT-I: Chapters 1 & 2      UNIT-II: Chapters 3 & 4      UNIT III: Chapters 5 & 6  
UNIT-IV: Chapters 10 & 11 UNIT-V: Chapters 12,13 &

### **14) REFERENCE BOOKS:**

1. DATABASE MANAGEMNET SYSTEMS – Arun Majumdar & Pritimoy Bhattacharya, 2007, TMH.
2. DATABASE MANAGEMETN SYSTEMS – Gerald V. Post, 3<sup>rd</sup> edition, TMH.

## **Core 9 :VISUALPROGRAMMING- VISUAL BASIC & VISUAL C++**

### **UNIT-I:**

Introducing Visual Basic: What is VB? – Event and Event Procedures – Object related concepts –VB program Development Process- Logical Program Organization -VB Program Components – VB environment – Opening, Saving, Running a VB Project – Visual Basic Fundamentals: constants – Variables – Data Types and Declarations – Operators and Expressions – Program Comments. Branching and Looping: Relational operators and Logical Expressions – Branching with If-Then, If-Then-Else blocks – Selection Select Case – Looping with For-Next, Do-Loop, While-Wend – Stop statement.

**UNIT-II:** Visual Basic control Fundamentals: Control tools – Control tool Categories – Working with Controls – Naming Forms and Controls – Assigning Property values to Forms and Controls – Executing commands – Displaying Output – Entering Input Data – Selecting Multiple Features, Exclusive Alternatives, Form from a List - Assigning Properties collectively – Generating Error Messages – Creating timed Events – Scroll Bars. Menus and Dialog Boxes: Building Drop-Down Menus – Accessing Menu from Keyboard – Menu Enhancements – Submenus – Pop-Up Menus – Dialog Boxes – more about MsgBox Function – The Input Box function.

### **UNIT-III:**

Procedures: Modules and Procedures – Sub Procedures – Event Procedures – Function Procedures – Scope – Optional Arguments.  
Arrays: Characteristics – Declarations –Processing – Passing Arrays to Procedures –  
Dynamic Arrays – Array-related Functions – Control Arrays – Looping with for Each-Next. Data Files : Sequential Data Files – Random-Access Data files– Binary files.

### **UNIT IV:**

Visual C++: Programming: MFC and Windows – MFC Fundamentals – MFS Class Hierarchy – MFC Member & Global Functions – Various Object Properties – Cobject, CArchive, CWinApp, CWnd, CFile, CGD, Object, CExcept, CDialog, CString, CEdit, CList –  
Resources: Menus – Accelerators, Dialogs, Icons, Bitmaps, Versions – Message Maps –  
Document/View Architecture.

### **UNIT V**

VC++ (Contd): connecting to Data Source – DAO – ODBC – Thread – Based Multitasking – Visual C++ APPWIZARD and class Wizard.

### **TEXTBOOKS:**

1. VISUAL BASIC – Byron S. Gottfried, Schaum's Outline series, TMH.
2. Eric A Smith, Valor Whisher, Hank Marquis, –Visual Basic 6 Programming Biblel.
- 3 . Herbert Schildt, –MFC Programming From the Ground upl Second Edition , Tata McGrawHill.

### **REFERENCE BOOKS**

1. MSDN Visual studio Library.
2. Cornell, –Visual Basic 6 From the Ground Upll, Tata McGraw – Hill Company Ltd
3. Mveller, –Visual C++ from the Ground upll, TMCH.
4. Viktor Toth, –Visual C++6 Unleasedll, Second Edition, Techmedia.

**CORE Lab 6 - VISUAL PROGRAMMING: VB, VC++ &  
ORACLE (One Program either from VB or VC++ and one from  
ORACLE)**

**VISUAL BASIC**

1. Write a simple VB program to accept a number as input and convert it into  
a. Binary b. Octal c. Hexa-decimal
2. Write a simple VB program to add items to list box with user input and move the selected item to combo box one by one.
3. Write a simple VB program to develop a calculator with basic operation.
4. Design a form using common dialog control to display the font, save and open dialog box without using the action control property.
5. Write a VB Program to develop a menu driven program. Add a MDI window in the form and arrange them in the cascading/horizontal style using menus (Create a menu to add form, arrange) (Menu Item 1). Also change the form color using the menu in another menu item (Menu Item 2).

**VISUAL C++**

1. Write a VC++ Program to display Toolbar and Status bar
2. Write a VC++ Program to add, delete string in a list box
3. Write a VC++ Program to perform menu Editor
4. Write a VC++ Program to perform Free Hand Drawing
5. Write a VC++ Program to perform serialization-SDI

**ORACLE**

1. **Create** a table for Employee details with Employee Number as primary key and following fields: Name, Designation, Gender, Age, Date of Joining and Salary. **Insert** at least ten rows and perform various **queries** using any one Comparison, Logical, Set, Sorting and Grouping operators.
2. Create tables for library management system which demonstrate the use of **primary key** and **foreign key**. Master table should have the following fields: Accno, Title, Author and Rate. Transaction table should have the following fields: User id, Accno, Date of Issue and Date of Return. Create a Report(**Select verb**) with fields Accno, Title, Date of Issue for the given Date of Return with column formats.
3. Write a PL/SQL to **update** the rate field by 20% more than the current rate in inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (**Alter**) called for Number of item and place for values for the new field without using PL/SQL block.
4. Write a PL/SQL to split the student table into two tables based on result (One table for "Pass" and another for "Fail"). Use **cursor** for handling records of student table. Assume necessary fields and create a student details table.
5. Create a database **trigger** to implement on **master** and **transaction** tables which are based on inventory management system for checking data validity. Assume the necessary fields for both tables.
6. Write a PL/SQL to raise the following **Exception** in Bank Account Management table when deposit amount is zero

## **Elective- I    E-Learning\*/Computer Networks/ Organizational Behavior\***

### **ELECTIVE-: E-LEARNING**

E-Learning Evolution - Advantages and Disadvantages of E-Learning - Instructional design Models for E-Learning -Applying User-Centered Design to E-Learning - Methods and Measures to Retain Students Enrolled in Online Education -Choosing an Effective Communication Tool.

#### **UNIT-II**

Flash : Geometric shape tools – Drawing tools- fill and stroke controls- Selection Tools.

#### **UNIT-III**

Creating Animation and Effects: Animation strategies – TimeLine Animation – Character animation Techniques – fundamentals of Editing.

#### **UNIT-IV**

Sound: Import and Export formats – Importing sound to flash – adding sound to timeline – synchronizing audio to animations- stopping sounds – Working with sound forge.

#### **UNIT-V**

Video: Integrating and Importing Video – Editing video with Adobe Premiere – Organizing & Editing clips – Adding Transition between clips – Adding special effects to video.

### **TEXT BOOKS**

1. MacroMedia flash 8 Bible - Robert Reinhardt and Snow Dowd. 2006, 1<sup>st</sup> Edition, Wiley India (P) Ltd, New Delhi.
2. E-Learning Concepts and Techniques - Pamela Berman, institute for Interactive Technologies, Bloomsburg University of Pennsylvania, USA (e-book), 2006,.

### **REFERENCES**

1. Flash 8 - Dinesh Maidasani. 2006 1<sup>st</sup> Edition, Firewall Media Publications, New Delhi.
2. Fred T.Hofstetter. 2001. MultiMedia Literacy, Tata McGraw Hill, New Delhi.
3. Multimedia making it work, Tay Vaughan. 2008. 7<sup>th</sup> Edition, Tata McGraw-Hill, New Delhi.

### **ELECTIVE:COMPUER NETWORKS**

Subject Description: This subject deals different Network concepts like Layers, Wireless Concepts, Transmission and Security.

Goal: Knowledge on Computer Networks and technologies like broadband and Bluetooth.

Objective: To inculcate knowledge on Networking concepts and technologies like wireless, broadband and Bluetooth.

UNIT-I: Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. Reference Models: OSI Reference Model – TCP/IP reference Model – Comparison of OSI and TCP/IP -Critique of OSI and protocols – Critique of the TCP/IP Reference model.

UNIT-II: PHYSICAL LAYER - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves. Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites – Satellites versus Fiber.

UNIT-III: DATA-LINK LAYER: Error Detection and correction – Elementary Data-link Protocols – Sliding Window Protocols. MEDIUM-ACCESS CONTROL SUB LAYER: Multiple Access Protocols – Ethernet – Wireless LANs - Broadband Wireless – Bluetooth.

UNIT-IV: NETWORK LAYER: Routing algorithms – Congestion Control Algorithms. TRANSPORT LAYER: Elements of Transport Protocols – Internet Transport Protocols: TCP.

UNIT-V: APPLICATION LAYER: DNS – E-mail. NETWORK SECURITY: Cryptography – Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures.

#### TEXTBOOKS:

1. COMPUTER NETWORKS – Andrew S. Tanenbaum, 4<sup>th</sup> edition, PHI.  
(UNIT-I:1.2-1.4      UNIT-II:2.2-2.4      UNIT-III:4.2-4.6      UNIT-IV:5.2,5.3,6.2,6.5      UNIT-V:7.1,7.2,8.1-8.4)

#### REFERENCE BOOKS:

1. DATA COMMUNICATION AND NETWORKS – Achyut Godbole, 2007, TMH.  
2. COMPUTER NETWORKS Protocols, Standards, and Interfaces – Uyles Black, 2<sup>nd</sup> ed, PHI.

### **ELECTIVE : ORGANIZATIONAL BEHAVIOR**

#### **Unit I**

Introduction to Organizational Behavior –Related Disciplines – Theoretical Framework – Organizational Approaches – Modern Organizational Scenario: Impact of Globalization

#### **Unit II**

Individual Behavior – Perception – Process – Changes - Personality and Attitudes – Job Satisfaction

#### **Unit III**

**Motivation: Needs, Content and Process:** Motivation: Content Theories – Process Theories – Contemporary Theories – Motivation Applied – Job Design and Goal setting. Leadership – Background – Process- Styles – Activities – Skills

#### **Unit IV**

Group Dynamics – The nature of Informal Organizations – Formal Groups – Interactive conflict: Interpersonal conflict – Inter-group behavior and conflict – Negotiation Skills: Going beyond conflict management – Traditional Negotiation Approaches - Contemporary negotiation skills.

#### **Unit V**

Communication – Role and background – Interpersonal communication – Informal communication- The Decision Making process – Participative Decision making techniques – Organization design – culture – Organization change and development

#### **Text Book:**

1. Fred Luthans, Organizational Behavior, 9th Edition, McGraw-Hill Irwin, 2002.  
2. John W. Newstorm and Keith Davis, Organizational Behavior, Tenth Edition, TMG, 1998

### **SKILL-3 – CS : SOFTWARE TESTING**

Subject Description: This subject deals software testing concepts like unit-wise testing, integration testing and acceptance testing.

Goal: Knowledge on software testing and how to test the software at various levels. Objective: To inculcate knowledge on Software testing concepts.

UNIT-I: Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing –Challenges in White-Box Testing.

UNIT-II: Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

UNIT-III: System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT-IV: Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing  
– When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT-V: Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

#### TEXTBOOKS:

1. SOFTWARE TESTING Principles and Practices – Srinivasan Desikan & Gopalswamy

Ramesh, 2006, Pearson Education.

(UNIT-I: 2.1-2.5, 3.1-3.4      UNIT-II: 4.1-4.4, 5.1-5.5      UNIT III: 6.1-6.7 (UNIT IV: 7.1-7.6, 8.1-8.5      UNIT-V: 15.1-15.6, 17.4-17.7)

#### REFERENCE BOOKS:

1. EFFECTIVE METHODS OF SOFTWARE TESTING–William E.Perry, 3<sup>rd</sup> ed, Wiley India.

2. SOFTWARE TESTING – Renu Rajani, Pradeep Oak, 2007, TMH.

## **CORE-11: GRAPHICS & MULTIMEDIA**

**Subject Description:** This subject deals with Graphics Concepts and Multimedia methodologies.

**Goal:** Mathematical Knowledge on Graphics and Technical background of Multimedia. **Objective:** To inculcate knowledge on Graphics & Multimedia concepts.

(GRAPHICS – UNITS I & II)

UNIT-I: Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT-II: 2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

(MULTIMEDIA – UNITS III, IV & V)

UNIT-III: Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT-IV: Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.

UNIT-V: Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.

### **TEXTBOOKS:**

1. COMPUTER GRAPHICS – Donald Hearn, M.Pauline Baker, 2<sup>nd</sup> edition, PHI.  
(UNIT-I: 3.1-3.6,4.1-4.5 & UNIT-II: 5.1-5.4,6.1-6.5)
2. PRINCIPLES OF MULTIMEDIA – Ranjan Parekh, 2007, TMH.  
(UNIT III: 4.1-4.7,5.1-5.16 UNIT-IV: 7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28  
UNIT-V: 9.5-9.10,9.13,9.15,10.10-10.13)

### **REFERENCE BOOKS:**

1. COMPUTER GRAPHICS – Amarendra N Sinha, Arun D Udai, TMH.
2. MULTIMEDIA: Making it Work – Tay Vaughan, 7<sup>th</sup> edition, TMH.



## **CORE LAB-7:PROGRAMMING LAB - GRAPHICS and MULTIMEDIA Multimedia:**

1. Create Sun Flower using Photoshop.
2. Animate Plane Flying in the Clouds using Photoshop.
3. Create Plastic Surgery for the Nose using Photoshop.
4. Create See-through text using Photoshop.
5. Create a Web Page using Photoshop.
6. Convert Black and White Photo to Color Photo using Photoshop.

### **Graphics:**

1. write a program to rotate an image.
2. write a program to drop each word of a sentence one by one from the top.
3. write a program to drop a line using DDA Algorithm.
4. write a program to move a car with sound effect.
5. write a program to bounce a ball and move it with sound effect.
6. write a program to test whether a given pixel is inside or outside or on a polygon.

### **Elective II: Network Security and Cryptography/ Artificial Intelligence and Expert Systems / Web Technology**

#### **ELECTIVE : NETWORK SECURITY & CRYPTOGRAPHY**

Subject Description: deals with principles of encryption algorithms, and conventional and public key cryptography.

Goal: enable to know the levels of network security and security tools. Objective:

to impart knowledge regarding cryptography and network security. UNIT-I:

Service mechanism and attacks – The OSI security architecture – A model for network security – symmetric Cipher model – Substitution techniques – transposition techniques – simplified des – block cipher principles – the strength of des – block cipher design principles and modes of operation.

#### **UNIT-II:**

Triple des-blow fish – RC5 Advanced Symmetric Block Ciphers –RC4 stream Cipher confidentially using symmetric encryption – introduction to number theory – public – key cryptography and RSA.

#### **UNIT-III:**

Key management – Diffie Hellman key exchange – message authentication and hash function – hash algorithm – digital signature and authentication protocols – digital signature standard.

#### **UNIT-IV:**

Authentication application – pretty good privacy – S/MIME – ip security – web security considerations –secure socket layer transport layer security –secure electronic transaction.

#### **UNIT-V**

Intruders –intrusion detection – password management –viruses and related threats – virus countermeasures – fire wall design principles – trusted systems

#### **TEXTBOOK:**

William Stallings, –Cryptography and Network Security Principles and Practices .  
Fourth edition, phi Education asia.

## REFERENCE BOOKS:

- 1) Atul kahate –Cryptography and Network Security second edition. TMH.
- 2) Behrouz A.forouzan Cryptography and Network Security – TMH.

## **ELECTIVE : ARTIFICIAL INTELLIGENCE AND EXPERT**

**SYSTEMS** Subject Description: This subject deals with various AI Concepts and Methodologies. Goal: To Acquire Knowledge on various AI Techniques and Expert Systems.

Objective: To have enriched knowledge regarding heuristic search, Knowledge representation and Expert systems

UNIT I: Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.

UNIT II: Heuristic Search techniques: Generate and Test – Hill Climbing – Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis.

UNIT III: Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem.

UNIT IV: Using Predicate Logic: Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction.

UNIT V: Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge

Brief explanation of Expert Systems-Definition- Characteristics-architecture-Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools.

Text Book:

1. Elaine rich and Kelvin Knight, –Artificial Intelligence –, Tata McGrawhill Publication, 2<sup>nd</sup> Edition, 1991.(chapters 1- 6 ).

Reference Book :

1. –Artificial Intelligence a modern Approach — Stuart Russell & Peter Norvig, 2<sup>nd</sup> Edition Perason Education.
2. –Artificial Intelligence –, George F Luger , 4<sup>th</sup> Edition , Pearsons Education Publ, 2002.
3. –Foundations of Artificial Intelligent and Expert Systems, V S JANAKI RAMAN, K SARUKESI, P GOPALAKRISHNAN, MacMillan India limited.,

## **ELECTIVE: WEB TECHNOLOGY**

**Subject Description:** This subject deals TCP/IP, FTP, WWW and Web technologies like ASP, JVM, DCOM, XML and WAP.

**Goal:** Knowledge on various Web technologies.

**Objective:** To inculcate knowledge web technological concepts and functioning internet.

**UNIT-I: TCP/IP:** TCP/IP Basics – Why IP address – Logical Address - TCP/IP Example- The concept of IP address – Basics of TCP – Features of TCP – Relationship between TCP and IP – Ports and Sockets – Active Open and Passive Open - TCP Connections – What makes TCP reliable? – TCP Packet format - Persistent TCP connections – UDP – Differences between TCP and UDP.

**UNIT-II: DNS – E-mail – FTP – TFTP – History of WWW – Basics of WWW and Browsing - Local information on the internet – HTML – Web Browser Architecture – Web Pages and Multimedia – Remote Login (TELNET).**

**UNIT-III: Introduction to Web Technology:** Web pages – Tiers – Concept of a Tier – Comparison of Microsoft and Java Technologies – Web Pages – Static Web Pages – Plug-ins – Frames – Forms. Dynamic Web Pages: Need – Magic of Dynamic Web Pages – Overview of Dynamic Web Page Technologies – Overview of DHTML – Common Gateway Interface – ASP – ASP Technology – ASP Example – Modern Trends in ASP – Java and JVM – Java Servlets – Java Server Pages.

**UNIT-IV: Active Web Pages:** Active Web Pages in better solution – Java Applets – Why are Active Web Pages Powerful? – Lifecycle of Java Applets – ActiveX Controls – Java Beans. Middleware and Component-Based E-Commerce Architectures: CORBA – Java Remote Method Invocation – DCOM. EDI: Overview – Origins of EDI – Understanding of EDI – Data Exchange Standards – EDI Architecture – Significance of EDI – Financial EDI – EDI and internet.

**UNIT-V: XML: SGML – Basics of XML – XML Parsers – Need for a standard. WAP: Limitations of Mobile devices – Emergence of WAP – WAP Architecture – WAP Stack – Concerns about WAP and its future – Alternatives to WAP.**

#### **TEXTBOOKS:**

1. WEB TECHNOLOGIES TCP/IP to Internet Applications Architectures – Achyut S Godbole & Atul Kahate, 2007 ,TMH.

*(UNIT-I: 3.1-3.5,4.1-4.12 UNIT-II: 5.1-5.4,6.1-6.7 UNIT III:8.1-8.1,9.1-9.13*

*UNIT IV: 10.1-10.7,15.1-15.3,16.1-16.8 UNIT-V: 17.1-17.4,18.1-18.6)*

#### **REFERENCE BOOKS:**

1. INTERNET AND WEB TECHNOLOGIES – Rajkamal, TMH.

2. TCP/IP PROTOCOL SUITE – Behrouz A. Forouzan, 3<sup>rd</sup> edition, TMH.

## **ELECTIVE : DATA MINING**

**Subject Description :** This Subject deals with the Data Mining

**Goal :** To learn about Data Mining

**Objective :** On Successful Completion of this subject the students should have knowledge on Data mining Concepts

**UNIT I:** Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

**UNIT II :** Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures– Decision Trees – Neural Networks – Genetic Algorithms.

**UNIT III :** Classification : Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques.

**UNIT IV:** Clustering : Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms . Partitional Algorithms.

**UNIT V:** Association Rules : Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

### **TEXT BOOK :**

Margaret H.Dunbam – – Data Mining Introductory and Advanced Topics – Pearson Education – 2003.

### **REFERENCE BOOK :**

Jiawei Han & Micheline Kamber – – Data Mining Concepts & Techniques – 2001 Academic Press.

## **ELECTIVE : OPEN SOURCE SOFTWARE**

Introduction to open sources – Need of open sources – advantages of open sources – application of open sources. Open source operating systems: LINUX : Introduction – general overview –Kernel mode and user mode –process – advanced concepts –scheduling – personalities – cloning – signals – development with Linux.

### Unit II

MySQL : Introduction – setting up account – starting, terminating and writing your own SQL programs-record selection Technology – working with strings – Date and Time – sorting Query results – generating summary –working with meta data –using sequences – MySQL and Web.

### Unit III

PHP: : Introduction –programming in web environment –variables- constants – data types – operators – statements – functions – arrays – OOP – string manipulations and regular expression – file handling and data storage – PHP and SQL database – PHP and LDAP – PHP connectivity – sending and receiving E-mails – debugging and error handling – security–templates.

## Unit IV

Syntax and style – python objects – numbers – sequences – strings – lists and tuples – dictionaries – conditional loops – files – input and output – errors and exceptions – functions – modules – classes and OOP – execution environment.

## Unit V

Pert backgrounder – pert overview – pearl parsing rules – variables and data – statements and control structures – subroutines -, packages and modules – working with files – data manipulation.

Text books:

1. The Linux Kernel book by Remy Card, Eric and Frank Mevel- Wiley Publications 2003.
2. MySQL Bible by Steve Suchring – John Wiley

2002. Reference Books:

1. Programming PHP by Rasmus Lerdorf and Levin Tatroe –O'Reilly 2002
2. Core Python Programming Wesley J. Chun Prentice Hall 2001
3. Perl : The Complete Reference 2 nd Edn by Martin c. Brown Tata McGraw-Hill 2009
4. MySQL : The Complete Reference 2 nd Edn by Vikram Vaswani Tata McGraw-Hill 2009
5. PHP : The Complete Reference 2 nd Edn by Steve Holzner Tata McGraw-Hill 2009

## **ELECTIVE : MASTERING LAN AND**

**TROUBLESHOOTING Subject Description** This Course presents the details of Local Area Networks. **Goals** To enable the students to learn about the internal organization of a PC

### **Objective**

On successful completion of the course the students should have:

- Understood types of faults and how to solve the problems

## **Contents**

### UNIT I PC- Hardware overview

Introduction to computer organization-Memory-PC family-PC hardware-interconnections between Boxes-Inside the boxes:-motherboard, daughter boards, floppy disk drive, HDD, speaker, mode switch, front panel indicators & Control-mother board logic- memory space-I/O port address-wait state-interrupts -I/O data transfer-DMA channels-POST sequence.

### UNIT II PERIPHERAL DEVICES

Floppy drive controller-Overview-Disk format-FDC system interface-FDD interface Hard Disk controller-overview-Disk Drives and interface-controller post description Hard disk card-Hard disk format.

**Display Adapter:-**CRT display- CRT controller principle -CRT controller 6845

**Printer controller:-**Centronics interface-programming sequence -Hardware overview- printer-sub assemblers.

### UNIT III MOTHERBOARD CIRCUITS

Mother board functions-functional units and inter communications:-Reset logic - CPU  
nucleus logic-DMA logic-Wait state logic-NM logic-speaker logic-keyboard interface-SMPS.

#### UNIT IV INSTALLATION AND MAINTENANCE

Introduction-pre installation planning -installation practice-routine checks-special configuration memory up gradation - HD up gradation - DOS command(Internal and external).Preventive maintenance-system usage.

#### UNIT V TROUBLE SHOOTING

Computer faults-nature of faults -types of faults -diagnostic programs and tools-fault elimination-systematic trouble shooting procedure mother board problem-serial port problems-FDC, HDC, display problems- display adapter-printer problem -monitor problems, HDC,FDC problems.

#### REFERENCE BOOKS:

1. B.Govindaraulu - "IBM PC and Clones", Tata McGraw Hill Co.1995.
2. Robert C Brenner - "IBM PC Trouble shooting and Repair guide", BPB publications.
3. Winn & Rosch - "Hardware Bible" , Tec media.
4. Ray Duncan - "Dos Programming".
5. Zacker – –Upgrading & Trouble shooting Networks – the complete reference, Tata McGraw Hill edition.
6. Meyers – –Introduction to PC Hardware and Trouble shooting, Tata McGraw Hill editions.

#### SKILL- 4 – CS : SOFTWARE TESTING LAB

*Write at least 10 TEST CASES for the following programs. Test cases can be for Input data, Conditional expressions, control transfer, output, etc. Run-Test-Debug- until all the test cases are in success status. Marks distribution as follows:*

1. List of Test Descriptions (at least 10) for the Program.  
(20%)
2. Test Cases  
(40%)
3. Program with all test case results success  
(30%)
4. Record  
(10%)

*TEST CASE Example:*

Test-Id	Test Description	Test Steps	Expected Output	Actual Output	Status
TC-01	Acceptance of 10 digit input data	Input 10 Digit Number	Accepting 10 digit number	Accepted 10 digit number	Success

TC-02	Non- acceptance of character data	Input a character data ='X'	Character X should not be accepted	Accepting Character data	Failure
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Modify PIC X(10) into PIC 9(10) and then run program for Test-id TC-02 again

TC-02	Non- acceptance of character data	Input a character data ='X'	Character X should not be accepted	Character data not accepted	Success
TC-03	Digit sum of 10 digit is in single digit	Output data	Single digit sum	Single digit Sum	Success

**BHARATHIAR UNIVERSITY: COIMBATORE-641  
046**

**B.Sc. CS/IT/CT/SS/MM/CSA  
&BCA**

(For the students admitted from the academic year **2011-2012** and onwards)

**CBCS  
PATTERN**

### **GUIDELINES FOR PROJECT WORK**

☐ ☐ The aim of the Project work is to acquire practical knowledge on the implementation of the programming concepts studied.

☐ ☐ Each student should carry out individually one Project Work and it may be a work Using the software packages that they have learned or the implementation of Concepts from the papers studied or implementation of any innovative idea.

☐ ☐ The Project work should be **compulsorily done in the college only under the supervision of the Department staff concerned.**

- **The work has to be done in two parts.**
- **During V Semester - Up to Logical System design.**
- **During VI Semester – Physical System Design**

☐ ☐ University Exam will be conducted as follows.

#### **End Semester Viva**

- An End- semester Viva-voce will be conducted at the end of V semester for 50 marks.
- There is no minimum or pass marks.
- Both the Internal ( Respective Guides) and External Examiners (25+25)Should Conduct the Viva-Voce Examination at the last day of the practical

session.

- Along with the mark sheet an ***Annexure report*** containing the candidate's Register no and Title of the Project work should be sent to the Controller of Examinations by the Examiners and a copy of the same has to be retained in the College.
- No candidate will be allowed to change the title of the Project work after the completion of End- semester Viva.
- For those absent on genuine grounds a common subliment End-Semester Viva-voce may be conducted at the University for All Colleges by obtaining prior permission from the COE on the recommendations from the HODs of respective colleges before the commencement of the next semester.

### **Final Viva**

- Final Viva-Voce will be conducted at the end of VI semester by Both the Internal (Respective Guides) and External Examiners (75+75), after duly verifying the ***Annexure Report*** available in the College, for a total of 150 marks at the last day of the practical session.
- Out of 75 marks, 50 for Project Evaluation and 25 for Viva.
- For awarding a pass, a candidate should have obtained 40% of the Total 200 marks (End semester Viva + Final Viva).



**PROJECT WORK**  
**TITLE OF THE DISSERTATION**

Bonafide Work Done by  
STUDENT NAME  
REG. NO.

Dissertation submitted in partial  
fulfillment of the requirements for the  
award of Bachelor of Computer  
Science.....  
Of Bharathiar University, Coimbatore-46.

College emblem

GUIDE

HOD

Submitted for the Viva-Voce Examination  
held on \_\_\_\_\_

Internal Examiner  
Examiner

External

MONTH - YEAR

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ACKNOWLEDGEMENT CONTENTS SYNOPSIS

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2.1.1 DRAWBACKS

2.2 PROPOSED SYSTEM

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### 3. SYSTEM DESIGN AND DEVELOPMENT

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3.5.1 DESCRIPTION OF MODULES

(Detailed explanation about the project work)

### 4. TESTING AND IMPLEMENTATION

### 5. CONCLUSION BIBLIOGRAPHY APPENDICES

A. DATA FLOW DIAGRAM B. TABLE STRUCTURE

C. SAMPLE CODING D. SAMPLE INPUT

E. SAMPLE OUTPUT