Annexure No.	32 A
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046
REGULATIONS FOR B.Sc. COMPUTER SCIENCE DEGREE COURSE
with Semester System

(Effective from the academic year 2007-2008)

1. Eligibility for Admission to the Course
    Candidate for admission to the first year of the B.Sc. COMPUTER SCIENCE degree course shall be required to have passed the higher secondary examination conducted by the Govt. of Tamil Nadu with any one of the following subjects: Mathematics / Computer Science / Statistics / Business mathematics or other examinations accepted as equivalent there to by the Syndicate, subject to such other conditions as may be prescribed there for.

2. Duration of the Course
    The course shall extend over a period of three years comprising of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects.

3. Course of Study
    The course of study for the B.Sc. COMPUTER SCIENCE degree course shall consist of the following

    a) Part - I
    Tamil or any one of the following modern/classical languages i.e. Telugu, Kannada, Malayalam, Hindi, Sanskrit, French, German, Arabic & Urdu. It shall be offered for the first two semesters with one examination at the end of each semester.

    b) Part – II : English
    The subject shall be offered during the first two semesters with one examination at the end of each semester. During third semester the subject communication skills will be offered as one of the core subject.

    c) Foundation Course
        The Foundation course shall comprise of two stages as follows:
            Foundation Course A : General Awareness (I & II semesters)
            Foundation Course B : Environmental Studies (III & IV semesters)

        The syllabus and scheme of examination for the foundation course A, General awareness shall be apportioned as follows.
            From the printed material supplied by the University   -   75%
            Current affairs & who is who?   -   25%
    The current affairs cover current developments in all aspects of general knowledge which are not covered in the printed material on this subject issued by the University.
        The Foundation course B shall comprise of only one paper which shall have Environmental Studies.

d) Part – III
Group A : Core subject – As prescribed in the scheme of examination.
Examination will be conducted in the core subjects at the end of every semester
Group B: allied subjects -2 subjects-4 papers
Examination shall be conducted in the allied subjects at the end of first four semesters.
Group C: application oriented subjects: 2 subjects – 4 papers
The application –oriented subjects shall be offered during the last two semesters of study viz., V and VI semesters. Examination shall be conducted in the subjects at the end of V & VI semesters.
Group D: field work/institutional training
Every student shall be required to undergo field work/institutional training, related to the application-oriented subject for a period of not less than 2 weeks, conveniently arranged during the course of 3rd year. The principal of the college and the head of the department shall issue a certificate to the effect that the student had satisfactorily undergone the field work/institutional training for the prescribed period.

Diploma Programme:
All the UG programmes shall offer compulsory diploma subjects and it shall be offered in four papers spread over each paper at the end of III, IV, V, & VI semesters.

e) Co-Curricular activities: NSS/NCC/Physical education
Every student shall participate compulsorily for period of not less than two years (4 semesters) in any one of the above programmes.

The above activities shall be conducted outside the regular working hours of the college. The principal shall furnish a certificate regarding the student's performance in the respective field and shall grade the student in the five point scale as follows

A-Exemplary
B-very good
C-good
D-fair
E-Satisfactory
This grading shall be incorporated in the mark sheet to be issued at the end of the appropriate semester (4th or 5th or 6th semester).

(Handicapped students who are unable to participate in any of the above activities shall be required to take a test in the theoretical aspects of any one of the above 3 field and be graded and certified accordingly).

4. Requirement to appear for the examinations

a) a candidate will be permitted to appear for the university examinations for any semester if
      i)   He/she secures not less than 75% of attendance in the number of working days during the semester.

ii)   He/she earns a progress certificate from the head of the institution, of having satisfactory completed the course of study prescribed in the subjects as required by these regulations, and

iii)   His/her conduct has been satisfactory.

Provided that it shall be open to the syndicate, or any authority delegated with such powers by the syndicate, to grant exemption to a candidate who has failed to earn 75% of the attendance prescribed, for valid reasons, subject to usual conditions.

b) A candidate who has secured less than 65% but 55% and above attendance in any semester has to compensate the shortage in attendance in the subsequent semester besides, earning the required percentage of attendance in that semester and appear for both semester papers together at the end of the latter semester.

c) A candidate who has secured less than 55% of attendance in any semester will not be permitted to appear for the regular examinations and to continue the study in the subsequent semester. He/she has to rejoin the semester in which the attendance is less than 55%

d) A candidate who has secured less than 65% of attendance in the final semester has to compensate his/her attendance shortage in a manner as decided by the concerned head of the department after rejoining the same course.

5. Restrictions to appear for the examinations

a) Any candidate having arrear paper(s) shall have the option to appear in any arrear paper along with the regular semester papers.

b) "Candidates who fail in any of the papers in Part I, II & III of UG degree examinations shall complete the paper concerned within 5 years form the date of admission to the said course, and should they fail to do so, they shall take the examination in the texts/ revised syllabus prescribed for the immediate next batch of candidates. If there is no change in the texts/syllabus they shall appear for the examination in that paper with the syllabus in vogue until there is a change in the texts or syllabus. In the event of removal of that paper consequent to change of regulation and / or curriculum after 5 year period, the candidates shall have to take up an equivalent paper in the revised syllabus as suggested by the chairman and fulfill the requirements as per regulation/ curriculum for the award of the degree.

6. Medium of Instruction and examinations
        The medium of instruction and examinations for the papers of Part I and II shall be the language concerned. For part III subjects other than modern languages, the medium of instruction shall be either Tamil or English and the medium of examinations is in English/Tamil irrespective of the medium of instructions. For modern languages, the medium of instruction and examination will be in the languages concerned.

7. Submission of Record Note Books for practical examinations

Candidates appearing for practical examinations should submit bonafide Record Note Books prescribed for practical examinations, otherwise the candidates will not be permitted to appear for the practical examinations. However, in genuine cases where the students, who could not submit the record note books, they may be permitted to appear for the practical examinations, provided the concerned Head of the department from the institution of the candidate certified that the candidate has performed the experiments prescribed for the course. For such candidates who do not submit Record Books, zero (0) marks will be awarded for record note books.

8. Passing Minimum
   a) A candidate who secures not less than 40% of the total marks in any subject including the Diploma and Foundation courses (theory or Practical) in the University examination shall be declared to have passed the examination in the subject (theory or Practical).
   b) A candidate who passes the examination in all the subjects of Part I, II and III (including the Diploma and Foundation courses) shall be declared to have passed, the whole examination.

9. Improvement of Marks in the subjects already passed

Candidates desirous of improving the marks awarded in a passed subject in their first attempt shall reappear once within a period of subsequent two semesters. The improved marks shall be considered for classification but not for ranking. When there is no improvement, there shall not be any change in the original marks already awarded.

10. Classification of Successful candidates
   a) A candidate who passes all the Part III examinations in the First attempt within a period of three years securing 75% and above in the aggregate of Part III marks shall be declared to have passed B.A/ B.Sc./B.Com./B.B.M. degree examination in <u>First Class with Distinctions</u>
   b) (i) A candidate who passes all the examinations in Part I or Part II or Part III or Diploma securing not less than 60 per cent of total marks for concerned part shall be declared to have passed that part in <u>First Class</u>
   (ii) A candidate who passed all the examinations in Part I or Part II or Part III or Diploma securing not less than 50 per cent but below 60 per cent of total marks for concerned part shall be declared to have passed that part in <u>Second Class</u>
   (iii) All other successful candidates shall be declared to have passed the Part I or Part II or Part III or Diploma examination in <u>Third Class</u>

11. Conferment of the Degree
 No candidate shall be eligible for conferment of the Degree unless he / she,
   i.   has undergone the prescribed course of study for a period of not less than six semesters in an institution approved by/affiliated to the University or has been exempted from in the manner prescribed and has passed the examinations as have been prescribed therefor.
   ii. Has satisfactory participates in either NSS or NCC or Physical Education as evidenced by a certificate issued by the Principal of the institution.
   iii. Has successfully completed the prescribed Field Work/ Institutional Training as evidenced by certificate issued by the Principal of the College.

12. Ranking

A candidate who qualifies for the UG degree course passing all the examinations in the first attempt, within the minimum period prescribed for the course of study from the date of admission to the course and secures I or II class shall be eligible for ranking and such ranking will be confined to 10 % of the total number of candidates qualified in that particular branch of study, subject to a maximum of 10 ranks.

The improved marks will not be taken into consideration for ranking.

13. Additional Degree

Any candidate who wishes to obtain an additional UG degree not involving any practical shall be permitted to do so and such candidate shall join a college in the III year of the course and he/she will be permitted to appear for par III alone by granting exemption form appearing Part I, Part II and common allied subjects (if any), already passed by the candidate. And a candidate desirous to obtain an additional UG degree involving practical shall be [permitted to do so and such candidate shall join a college in the II year of the course and he/she be permitted to appear for Part III alone by granting exemption form appearing for Part I, Part II and the common allied subjects. If any, already passed. Such candidates should obtain exemption from the university by paying a fee of Rs.500/-.

14. Evening College

The above regulations shall be applicable for candidates undergoing the respective courses in Evening Colleges also.

15. Syllabus

The syllabus for various subjects shall be clearly demarcated into five viable units in each paper/subject.

16. Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations will be in vogue without any change for a minimum period of three years from the date of approval of the Regulations. The University may revise /amend/ change the Regulations and Scheme of Examinations, if found necessary.

17. Transitory Provision

Candidates who have undergone the Course of Study prior to the Academic Year 2007-2008 will be permitted to take the Examinations under those Regulations for a period of four years i.e. up to and inclusive of the Examination of April 2012 thereafter they will be permitted to take the Examination only under the Regulations in force at that time.

B.Sc. COMPUTER SCIENCE & COMPULSORY DIPLOMA IN SOFTWARE TESTING
SCHEME OF EXAMINATION FROM THE ACADEMIC YEAR 2007-08

Subjects	Ins. Hrs/Wk	Dur	Max Marks
Semester I			
1. Part-I: Language-I	6	3	100
2. Part-II: English-I	6	3	100
3. Core 1: Cobol Programming	4	3	100
4. Core 2: Digital Fundamentals and Architecture	4	3	100
5. Core Lab 1: Programming Lab - Cobol	4	3	100
6. Allied 1: Mathematical Structures for Computer Science	4	3	100
7. Foundation Course-A (General Awareness)	2	-	-
Semester II			
1. Part-I: Language-II	6	3	100
2. Part-II : English-II	6	3	100
3. Core 3: Data Structures and C Programming	6	3	100
4. Core Lab 2: Programming Lab – C (Data Structures)	5	3	100
5. Allied 2: Discrete Mathematics	5	3	100
6. Foundation Course-A (General Awareness)	2	3	100
Semester III			
1. Core 4: Communication Skills	4	3	100
2. Core 5: System Software and Operating System	5	3	100
3. Core 6: C++ Programming	5	3	100
4. Core Lab 3: Programming Lab - C++	5	3	100
5. Allied 3: Operation Research	6	3	100
6. Foundation Course-B (Environment Studies)	2		--
7. Diploma 1 : Software Engineering	3	3	100
Semester IV			
1. Core 7: Computer Networks	6	3	100
2. Core 8: Graphics and Multimedia	6	3	100
3. Core Lab 4: Programming Lab - Graphics and Multimedia	6	3	100
4. Allied 4: Business Accounting	6	3	100
5. Foundation Course-B (Environment Studies)	2	3	100
6. Diploma 2: Software Testing	4	3	100
Semester V			
1. Core 9: Rdbms & Oracle	5	3	100
2. Core 10: Visual Programming - Visual Basic	5	3	100
3. Core 11: Artificial Intelligence and Expert Systems	5	3	100
4. AOS1: Client/Server Computing	5	3	100
5. Core Lab 5: Programming Lab - VB & Oracle	6	3	100
6. Diploma 3: Softwre Project Management	4	3	100
Semester VI			
1. Core 12: Network Security and Cryptography	5	3	100
2. Core 13: Web Technology	5	3	100
3. Core 14: Java Programming	5	3	100
4. AOS 2: Data Mining	5	3	100
5. Core Lab 6: Programming Lab - Java	6	3	100
6. Diploma 4 (Lab): Software Testing Lab	4	3	100
Total Marks B.Sc. (CS) Course			3200
Diploma Course			400

CORE 1 : COBOL PROGRAMMING

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. ROY & D.GHOSH DASTIDAR,TATA Mc.GRAW HILL, SECOND EDITION - 1998.
Reference Books:
1. COBOL programming – V. Rajaraman, PHI Pub.
2. Introduction To Cobol Programming – Author Dr. R. Krishnamoorthy, JJ Publications.
3. Structured COBOL – Welburn, Tata McGrawhill, 4th Edition.

CORE 2 : DIGITAL FUNDAMENTALS AND ARCHITECTURE

Subject Description:
        This subject deals with fundamentals of digital computers, Microprocessors and system architecture.
Goal: To learn about computer fundamentals and its organization.
Objective:
        On successful completion of this subject the students should have :
- Knowledge on digital circuits
- Microprocessor architecture
- 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, T - Multiplexers – Demultiplexers – Decoder – Encoder - Counters.

Unit III
        MICROPROCESSOR: Architecture – Bus Organization – Functional diagram and pin out diagram of 8085 - Addressing modes of 8085 – Instruction set of 8085 – I/O Schemes – Peripherals and Interfaces.

Unit IV
        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 V
        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.

Text Books:
1. Digital Electronics Circuits and Systems, V.K. PURI, TATA McGRAW-HILL Pub. Company
2. Computer System Architecture, M. MORRIS MANO, Pearson Education Pub, III Edition.

Reference Books:
1. Digital principles and applications, Albert paul malvino, Donald P Leach, McGrawHill, 1996.
2. Computer Architecture, Carter, Schaums outline series, TMH.

CORE LAB -1 : PROGRAMMING LAB - COBOL

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 the given date (DDMMYY) and display the result in the following specified format:
   For eg : 030498→3rd 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 (crated 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 indexed sequential 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 (crated 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 crate 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   DESCR IPTION   SAFETY-LEVEL CLOSE-STOCK

Allied 1: MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE

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 Jordon, Gauss Seidal methods. The solution of Numerical Algebraic & Transcendental equation – Bisection method – Newton – Rephson 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 & poision Distribution

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

CORE 3 : DATA STRUCTURES AND C PROGRAMMING

Subject Description:
This subject deals with the methods of data structures using C programming language.
Goal: To learn about C programming language using data structural concepts.
Objective:
On successful completion of this subject the students should have writing programming ability on data structures dealing with Stacks, Queues, List, Searching and Sorting algorithms etc.,

UNIT – I:
Programming development methodologies – Programming style – Problem solving techniques: Algorithm, Flowchart, Pseudocode - Structure of a C program – C character set – Delimiters – Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Declaring and initializing variables – Type conversion.
Operators and Expressions – Formatted and Unformatted I/O functions – Decision statements – Loop control statements.

UNIT – II:
Arrays – String and its standard functions.
Pointers – Functions – Preprocessor directives: #define, #include, #ifndef, Predefined macros.
UNIT – III:
Structure and Union: Features of structure, Declaration and initialization of structure, Structure within structure, Array of structure, Pointer to structure, Bit fields, Enumerated data types, Union.
Files: Streams and file types, Steps for file operation, File I/O, Structures read and write, other file functions, Command line arguments, I/O redirection.
UNIT – IV:
Linear data structures: Introduction to data structures – List: Implementations, Traversal, Searching and retrieving an element, Predecessor and Successor, Insertion, Deletion, Sorting, Merging lists – Stack: Representation, Terms, Operations on stack, Implementation.
Single linked list, Linked list with and without header, Insertion, Deletion, Double linked list – Queues: Various positions of queue, Representation

UNIT V:
Searching and Sorting – Searching: Linear, Binary. Sorting – Insertion, Selection, Bubble, Quick, Tree, Heap.

TEXT BOOK:
1. Ashok N Kamthane, "PROGRAMMING AND DATA STRUCTURES" – Pearson Education, First Indian Print 2004, ISBN 81-297-0327-0.
REFERENCE BOOK:
1. E Balagurusamy: Programming in ANSI C, Tata McGraw-Hill, 1998.
2. *Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structure, Galgotia Book Source, 1999.*
3. Data structure using C – Aaron M Tanenbaum, Yedidyeh langsam, Moshe J Augenstein, PHI Pub

CORE LAB-2: PROGRAMMING LAB – C (DATA STRUCTURES)

1. Write a C program to create two array list of integers. Sort and store the elements of both of them in the third list.

2. Write a C program to experiment the operation of STACK using array implementation.

3. Write a C program to create menu driven program to implement QUEUE to perform the following:
    (i)   Insertion
    (ii)   Deletion
    (iii)   Modification
    (iv)   Listing of elements using points

4. Write a C program to create LINKED LIST representation of employee records and do the following operations using pointers:
    a. To add a new record
    b. To delete an existing record
    c. To print the information about an employee
    d. To find the number of employees in the structure.

5. Write a C program to count the total nodes of the linked list.

6. Write a C program to insert an element at the end of the linked list.

7. Write a C program to insert an element at the beginning of the Double linked list.

8. Write a C program to display the hash table, which is to be prepared by using the Mid-square method.

9. Write a C program to demonstrate Binary search.

10. Write a C program to insert nodes into a Binary tree and to traverse in pre-order.

11. Write a C program to arrange a set of numbers in ascending order using QUICK-SORT.

12. Write a C program to arrange a set of numbers in descending order using EXCHANGE-SORT.

ALLIED 2: DISCRETE MATHEMATICS

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- prepositional 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 compute 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
　　　2.　Discrete Mathematics – Dr M. K. Venketaramen, Dr N.Sridharan, N. Chandarasekaran – The National publishing Company Chennai.

CORE-5: 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.

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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 " , 2nd Edition, Perason Education Publication,2003.

REFERENCE BOOKS :
1. Achyut s Godbole , " Operating Systems" , TMH Publications , 2002
2. John J. Donovan , "Systems Programming " , TMH Publications , 1991
3. D.M. Dhamdhrer, "Systems Programming and Operating Systems ", 2nd Revised Edition.

CORE 6 : 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, Hierarchal, 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 Mc-Grawhill Pupblication, 1998.
2. Maria Litvin & Gray Litvin , C++ for you, Vikas publication, 2002.
3. John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

CORE LAB - 3 : 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 stings. 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, TRIANGE 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: OPERATION RESEARCH

Subject Description:
This subject deals with various optimization techniques for linear programming , Transportation and 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.

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. MANMOHAN, P.K. GUPTA, KANTHISWARUP - OPERATIONS RESEARCH - S. CHAND & SONS - 1997.

REFERENCE BOOKS
1. Hamdy A Taha "Operations Research" , Pearson Education, 7th edition,2002
   Problems in operations research - P K Gupta D S Hira, S. Chand Pub

DIPLOMA-1: SOFTWARE ENGINEERING

Subject Description: This subject deals with Software Engineering concepts like Analysis, Design, Implementation, Testing and Maintenance.

Goal: Knowledge on how to do a software project with in-depth analysis.

Objective: To inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.

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UNIT-I: Introduction to Software Engineering: Definitions – Size Factors – Quality and Productivity Factors. Planning a Software Project: Planning the Development Process – Planning an Organizational Structure.

UNIT-II: Software Cost Estimation: Software cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs.

UNIT-III: Software Requirements Definition: The Software Requirements specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.

UNIT-IV: Design Notations – Design Techniques. Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.

UNIT-V: Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance – Configuration Management.

TEXTBOOK:

1. SOFTWARE ENGINEERING CONCEPTS – Richard Fairley, 1997, TMH.
(UNIT-I: 1.1-1.3,2.3-2.4   UNIT-II: 3.1-3.4   UNIT III: 4.1-4.2,5.1-5.2
UNIT-IV: 5.3-5.4,6.1-6.4   UNIT-V: 8.1-8.2, 8.5-8.6, 9.1-9.3)

REFERENCE BOOKS:

1. Software Engineering for Internet Applications – Eve Anderson, Philip Greenspun, Andrew Grumet, 2006, PHI.
2. Fundamentals of SOFTWARE ENGINEERING – Rajib Mall, 2nd edition, PHI
3. SOFTWARE ENGINEERING – Stephen Schach, 7th edition, TMH.

CORE-7: 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, 4th 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 – Uyless Black, 2nd ed, PHI.

CORE-8: 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, 2nd 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, 7th edition, TMH.

CORE LAB-4: 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 an move it with sound effect.
6. write a program to test whether a given pixel is inside or outside or on a polygon.

Annexure No.	58 A
SCAA Dated	20.02.2008

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046.

COMMERECE ALLIED PAPER – BUSINESS ACCOUNTING
FOR B.Sc., Computer Science, B.Sc. Software System and BCA degree courses
(for the students admitted from the academic year 2007-2008 and onwards)

Credit Hours: 4
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

DIPLOMA-2: 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.
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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 f 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, 3rd ed, Wiley India.
2. SOFTWARE TESTING – Renu Rajani, Pradeep Oak, 2007, TMH.

CORE-9: 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: Oracle9*i*: 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 - *i*SQL *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 – SQ L 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 ORCLE – Nilesh Shah, 2nd 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, 3rd edition, TMH.

CORE-10: VISUAL PROGRAMMING -VISUAL BASIC

Subject Description: This subject deals Visual Basic Programming concepts.

Goal: Knowledge on Visual Programming and how to develop a Project.

Objective: To inculcate knowledge on Programming and Project Development using Visual Basic.

UNIT-I: Introducing Visual Basic: What is VB? – Event and Event Procedures – Object-related concepts –VB program Development Process – Required Computer Skills – Logical Program Organization -VB Program Components – VB environment – Opening, Saving, Running a VB Project – Getting Help – Sample VB project. Visual Basic Fundamentals: Numeric, String constants – Variables – Data Types and Declarations – Operators and Expressions –Hierarchy of Operations – Inserting Parentheses – Special Rules concerning Numeric Expressions – String Expressions - Assigning Values to Variables – Displaying out – Library Functions - 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.

UNIT-III: 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. Executing and Debugging a New Project: Syntax errors – Logical errors – Setting Breakpoints – Defining Watch Values – Stepping Through a Program – User-induced Errors – Error-handlers – Generating a Stand alone Executable Program.

UNIT-IV: Procedures: Modules and Procedures – Sub Procedures – Event Procedures – Function Procedures – Scope – Optional Arguments. Arays: Characteristics – Declarations – Processing – Passing Arrays to Procedures – Dynamic Arrays – Array-related Functions – Control Arrays – Looping with for Each-Next.

UNIT-V: Data Files: Characteristics – Accessing and Saving a File in VB: The Common Dialog Control – Processing a Data file – Sequential Data Files – Random-Access Data files – Binary files.

TEXTBOOK:
1. VISUAL BASIC – Byron S. Gottfried, Schaum's Outline series, TMH.
(UNIT-I: Chapters 1, 2 & 3   UNIT II: Chapter 4   UNIT-III: Chapter 5 & 6   UNIT-IV: Chapters 7 & 8 UNIT V: Chapter 9)

REFERENCE BOOK:
1. The Complete reference VISUAL BASIC – Noel Jerke, TMH.

CORE-11: 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, 2nd Edition, 1991.(chapters 1- 6).

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

AOS-1: CLIENT/SERVER COMPUTING

Subject Description: This subject deals with concepts of Client / Server computing. Also it deals with various components of Client / Server Applications.

Goal: Knowledge on Client / Server Concepts and various components of client / server Applications.

Objective: To inculcate knowledge on Client / Server concepts.
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UNIT-I: Client / Server Computing – Advantages of Client / Server Computing – Technology Revolution – Connectivity – Ways to improve Performance – How to reduce network Traffic.

UNIT-II: Components of Client / Server Applications – The Client: Role of a Client – Client Services – Request for Service. Components of Client / Server Applications – The Server: The Role of a Server – Server Functionality in Detail – The Network Operating System – What are the Available Platforms – The Server Operating system.

UNIT-III: Components of Client / Server Applications – Connectivity: Open System Interconnect – Communications Interface Technology – Inter-process communication – WAN Technologies.

UNIT-IV: Components of Client / Server Applications – Software. Components of Client / Server Applications – Hardware.

UNIT-V: Components of Client / Server applications – Service and Support: System Administration. The Future of Client / Server Computing: Enabling Technologies – Transformational Systems.

TEXTBOOKS:
1. CLIENT / SERVER COMPUTING – Patrick Smith, Steve guenferich , 2nd edition, PHI.
(Chapters 1-8 & 10)

Reference Book :
1."Robert Orfali, Dan Harkey, Jeri edwards: the essential client/server survival guide", II edition galgotia publication private limited.
2."Dewire and Dawana Travis "Client/ Server Computing ", TMH.

CORE LAB-5: PROGRAMMING LAB - VB & ORACLE
PRACTICAL LIST

VISUAL BASIC
1. Write a simple VB program to accept a number as input and convert them into
    a. Binary
    b. Octal
    c. Hexa-decimal

2. Write a simple VB program to add the 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 an form using common dialog control to display the font, save and open dialog box without using the action control property.

5. Write a simple program to prepare a Questionnaire.

6. 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).

ORACLE
Data Definition Basics
7. Create the following table   *(PK - Primary Key, FK – Foreign Key)* cat_head, route_head, place_head, route_detail, ticket_detail, ticket_head with the mapping given below:

cat_head	route_head
(cat_code PK)	*(cat_code FK)*
route_head	route_detail
(route_id PK)	*(route_id FK)*
ticket_head	ticket_detail
(tick_no PK)	*(tick_no FK)*
place_head	route_detail
(place_id PK)	*(place_id FK)*

  (i)   Alter the table ticket_header to add a check constraint on ticket_no to accept values between 1 and 500
  (ii) Alter table route_header to add a column with data type as long.

Data Manipulation Basics
8. (a) Insert values to above tables
    (b) Display only those routes that originate in madras and terminate at cochin
    (c) Display only distinct category code from the table route_header in descending manner.
    (d) Update the table route_header to set the distance between madras and coimbatore as 500

Queries

9. a. Select rows from ticket_details such that ticket number greater than any ticket_number in
      Ticket_header.

    B. Select rows from route_header such that the route_id are greater than all route_id in route_detail
      Where place id is "100".

    C. Create view tick from ticket_header with Ticket_no, Origin, Destination, route_id

Report

10. Generate a report from the table ticket_detail for the particular ticket_no

PL/SQL

11.

      a. Write a PL/SQL block to update the bus_station to be "ERODE" where place_id is '01' or '05' [place_header]
      b. Write a PL/SQL block to satisfy the following condition by accepting the route_id as user input. If the distance is less than 500 than update the fare to be 200
      c. Write a Database trigter before insert for each row on the table route_detail not allowing transaction on Saturday / Sunday
      d. Write a Database trigger before delete for each row not allowing deletion and give the appropriate message on the table route_details

PROJECT

12. Develop a Simple Project for Student Database Management System using VB as front end and ORACLE as back end.

DIPLOMA-3: SOFTWRE PROJECT MANAGEMENT

Subject Description: This subject deals with various Techniques for Software Project Management.

Goal: Enables to have sound knowledge on Software Project Management.

Objective: To inculcate knowledge on how to manage a Software Project.

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UNIT-I: Introduction to Software Project management: Introduction – Why is Software project management is important? – What is a project? – Software project versus other types of project – Contract Management and technical project management – Activities covered by software project management – plans, methods, methodologies – some ways of categorizing software projects. Stepwise: an overview of project planning. Programme Management and Project Evaluation: Programme Management – Managing the Allocation of resources within programmes – strategic programme management – creating a programme – aids to programme management – Benefits Management – Evaluation of Individual projects – technical assessment – cost-benefit analysis - cash flow forecasting – cost-benefit evaluation techniques – risk evaluation.

UNIT-II: Software Effort Estimation: Where are estimation done? – Problem with over and under-estimates – basis for software estimating – software effort estimation techniques – expert judgment – estimating by analogy. Activity Planning: The objectives – When to plan? – Project schedules – project and activities – sequencing and scheduling activities – Network Planning models – formulating a network model – adding time dimension – forward pass – backward pass. Risk Management: Risk – Categories – Dealing with risk – Risk identification, assessment, planning and management – Evaluating risk to schedule.

UNIT-III: Resource Allocation: Introduction - Nature of resources – identifying the resource requirements – scheduling resources – creating critical path – counting the cost – being specific – publishing the resource schedule – cost schedules – scheduling the sequence. Monitoring and Control: Creating framework – collecting the data – visualizing progress – cost monitoring – earned value analysis – prioritizing monitoring – getting the project back to target – change control.

UNIT-IV: Managing Contracts: ISO 12207 approach – supply process – types of contract – stages in contract placement, management – acceptance. Managing People and Organizing Terms: understanding behavior – organizational behavior – selecting the right person for the job – instruction in the best methods – Motivation – Working in groups – becoming a team – decision making – Leadership – organizational structures – dispersed and virtual teams - influence of culture – stress – health and safety.

UNIT-V: Software Quality: The place of software quality in project planning – importance of software quality – defining software quality – ISO 9126 - practical software quality measures – product vs process quality management – external standards – techniques to help enhance software quality- quality plans. Small Projects: Introduction – Some problems with student projects – content of a project plan – conclusion.

TEXTBOOK:

1. SOFTWARE PROJECT MANAGEMENT – Bob Hughes & Mike Cotterell, 4th ed, PHI.

CORE-12: 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 chipper principles – the strength of des – block chipper design principles and modes of operation.

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

UNIT-III:
Key management – Diffle 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.

CORE-13: 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.
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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, 3rd edition, TMH.

CORE-14: 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.

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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 rd Edition, TMH.

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

AOS-2: DATA MINING

Subject Description: This subject deals with various Data Mining Techniques.

Goal: Enables to have sound knowledge on data mining Techniques..

Objective: To inculcate knowledge on Data mining Concepts.

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UNIT-I: Introduction: Nature of Data Sets – Models and Patterns – Data mining Tasks – Components of Data mining Algorithms – The interacting roles of Statistics and Data mining – Dredging, Snooping and Fishing. Measurement of Data: Types of measurement - Distance Measures – Transforming Data – The form of Data – Data Quality for individual measurements – Data Quality for Collections of data.

UNIT-II: Visualizing and Exploring Data: Summarizing Data –Tools for Displaying single variables – Tools for displaying relationships between two variables - Tools for displaying relationships more than two variables – Principal Components analysis – Multi-dimensional scaling. Data Analysis and Uncertainty: Dealing with Uncertainty – Random Variables and their relationships – Samples and statistical inference – Estimation – Hypothesis Testing – sampling Methods.

UNIT-III: A Symmetric Overview of Data Mining Algorithms: CART algorithm for Building Tree Classifiers – The Reductionist Viewpoint on Data mining algorithms. Score Functions for Data Mining Algorithms: Scoring Patterns – Predictive versus Descriptive Scoring Functions – Scoring models with Different Complexities – Evaluation of Models and Patterns – Robust Methods.

UNIT-IV: Search and Optimization Methods: Searching for models and Patterns – Parameter Optimization Methods – Optimization with missing data: EM algorithm – Online and Single Scan algorithms – Stochastic Search and optimizing Techniques. Data Organization and Databases: Memory hierarchy – Index Structures – Multi-dimensional Indexing – Relational Databases – Manipulating Tables – SQL – Query Execution and Optimization – Data warehousing and On-Line Analytical Processing (OLAP) – Data structures for OLAP – String Databases – Massive Data Sets, Data Management, and Data mining.

UNIT-V: Rule Representations – Frequent Itemsets and Association Rules – Generalizations – Finding Episodes from Sequences – Selective Discovery of Patterns and Rules – From Local Patterns to Global Models – Predictive Rule Induction. Retrieval by Content: Introduction – Evaluation of Retrieval Systems - Text Retrieval – Modeling Individual Preferences. Image Retrieval – Time Series and Sequential Retrieval.

TEXTBOOK:
1. Principles of DATA MINING – David Hand, Heikki Mannila & Padhraic Smyth – PHI.

REFERENCE BOOK:
1. DATA WAREHOUSING Concepts, Techniques, Products and Applications – C.S.R.Prabhu, PHI.

CORE LAB-6: 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.

DIPLOMA-4: 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
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

PRACTICAL LIST

1. Test the COBOL program: Finding the sum of individual digits of a 10-digit number until a single digit is produced.

2. Test the COBOL program: 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. Test the COBOL program: Accept the date in DDMMYY format and display the result in the format 3rd APR 1998.

4. Test the C program: Sort and store the elements two arrays of integers into the third list.

5. Test the C program: Experiment the operations of STACK using array implementation.

6. Test the C program: Menu-driven option for QUEUE operations to perform the following:
   1. Insertion
   2. Deletion
   3. Modification
   4. List
7. Test the C++ Program: Palindrome string checking program. (using Pointers)