SRI SANKARA ARTS & SCIENCE COLLEGE
AUTONOMOUS

DEPARMENT OF COMPUTER SCIENCE

BACHELOR OF COMPUTER APPLICATION

CHOICE BASED CREDIT SYSTEM.

REGULATIONS

1. ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of Bachelor of Computer Application courses shall be required to have passed the Higher Secondary Examinations (Academic or Vocational Stream) conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereof by the Syndicate of the University of Madras. Provided that candidates for admission into the specific main subject of study shall be Possess such other qualifying conditions as may be prescribed by the University as given in the **APPENDIX-A.**

2. ELIGIBILITY FOR THE AWARD OF DEGREE:

A candidate shall be eligible for the award of the Degree only if he /she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years, passed the examinations all the Six-Semesters prescribed earning 140 Credits (in Parts-I, II, III, IV & V).

3. DURATION:

a)   Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year the third and fourth semesters and the third academic year the fifth and sixth semester respectively.

b)   The odd semesters shall consist of the period from June to November of each year and the even semesters from December to April of each year. There shall be not less than 90 working days for each semester.

4. COURSE OF STUDY:

The main Subject of Study for Bachelor Degree Courses shall consist of the following and shall be in accordance with **APPENDIX-B**

PART – I   TAMIL / OTHER LANGUAGES

PART – II   ENGLISH

PART – III   CORE SUBJECTS
ALLIED SUBJECTS
PROJECT/ELECTIVES WITH THREE COURSES

PART – IV

1.(a)   Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6th Standard).

(b)   Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Advanced Tamil comprising of two courses.

(c)   Others who do not come under a + b can choose non-major elective comprising of two courses.

2.   SKILL BASED SUBJECTS (ELECTIVE) - (SOFT SKILLS)

3.   ENVIRONMENTAL STUDIES

4   VALUE EDUCATION

PART – V   EXTENSION ACTIVITIES

5. EXTENTION ACTIVITIES:

A candidate shall be awarded a maximum of 1 Credits for Complusory Extension Service.

All the Students shall have to enrol for NSS /NCC/ NSO (Sports & Games) Rotract/ Youth Red cross or any other service organizations in the college and shall have to put in Complusory minimum attendance of 40 hours which shall be duly certified by the Principal of the college before 31st March in a year. If a student LACKS 40 HOURS ATTENDANCE in the First year, he/she shall have to compensate the same during the subsequent years.

Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will ONE CREDIT.

Literacy and population Education Field Work shall be compulsory components in the above extension service activities.

6. SCHEME OF EXAMINATION:

Scheme of Examination shall be given in **APPENDIX – C**

Model Scheme

Course Component Name of the course	Inst. Hour	Credits	Exam Hours	Max. Marks		
				Ext.mark	**Int. mark**	**Total**
PART-I **Language**				**75**	**25**	**100**
PART-II **English**				**75**	**25**	**100**
PART-III **Core subject :**				**75**	**25**	**100**
Core Subject				**75**	**25**	**100**
Allied Subject				**75**	**25**	**100**
PART – IV 1.(a) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6th Standard). (b) Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Advanced Tamil comprising of two courses. (c) Others who do not come under a + b can choose non-major elective comprising of two courses.						
2*Skill based subjects(Elective) – (Soft Skill)						

The following procedure be be followed for Internal Marks:

Theory Papers: Internal Marks   25

INTERNAL MARKS

Tests   (2 out of 3)   = 10

Attendance   = 5

Seminars   = 5

Assignments   = 5

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25 marks

Break-up Details for Attendance

Below 60%   - No marks

60% to 75%   - 3 marks

76% to   90 %   - 4 marks

91% to 100%   - 5 marks

Practical: Internal Marks   40

Attendance   5 marks

Practical Test best 2 out of 3   30 marks

Record   5 marks

Project:

Internal Marks   best 2 out of 3 presentations   20 marks

Viva   20 marks

Project Report   60 marks

7. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER:

i. Candidates shall register their names for the First Semester Examination after the admission in UG Courses.

ii. Candidates shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination subject to the condition that the candidates should register for all the arrear subject of earlier semesters along the current (subsequent) Semester Subjects.

iii. Candidates shall be eligible to go to subsequent semester, only if they earn, sufficient attendance as prescribed therefor by the Syndicate from time to time.

Provided in case of a candidate earning less than 50% of attendance in any one of the Semesters due to any extraordinary circumstances such as medical grounds, such candidates who shall produce Medical Certificate issued by the Authorised Medical Attendant (AMA), duly certified by the Principal of the college, shall be permitted to proceed to the next semester and to complete the Course of study. Such Candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the course, after paying the fee for the break of study as prescribed by the University from time to time.

8. PASSING MINIMUM:

A candidate shall be declared to have passed:

a)   There shall be no Passing Minimum for Internal.

b)   For External Examination, Passing Minimum shall be of 40%(Forty Percentage) of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva-voce.

c)   In the aggregate (External + Internal) the passing minimum shall be of 40% .

d)   He/She shall be declared to have passed the whole examination, if he/she passes in all the papers and practicals wherever prescribed / as per the scheme of examinations by earning 140 CREDITS in Parts-I, II, III, IV & V. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 Credit to qualify for the Degree.

9. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

PART- I TAMIL / OTHER LANGUAGES

TAMIL/OTHER LANGUAGES: Successful candidates passing the Examinations for the Language and securing the marks (1) 60 percent and above and (ii) 50 percent and

above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD Class.

PART – II ENGLISH

ENGLISH: Successful candidates passing the examinations for English and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD class.

PART – III consisting of CORE SUBJECTS, ALLIED SUBJECTS, PROJECT / ELECTIVE with three courses:

Successful candidates passing the examinations for Core Courses together and securing the marks (i) 60 percent and above (ii) 50 percent and above but below 60 percent in the aggregate of the marks prescribed for the Core courses together shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examinations in the Third Class.

PART – IV (consisting of sub items 1 (a), (b) & (c), 2, 3 and 4) as furnished in the Regulations 4 Part-IV supra.

PART – V EXTENTION ACTIVITIES:

Successful Candidate earning of 1 credit SHALL NOT BE taken into consideration for Classification/Ranking/ Distinction.

10. RANKING:

Candidates who pass all the examinations prescribed for the course in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking/ Distinction.

Provided in the case of Candidates who pass all the examinations prescribed for the Course with a break in the First Appearance due to the reasons as furnished in the Regulations. 7 (iii) supra are only eligible for classification.

11. TRANSITORY PROVISION:

Candidates who have undergone the course of study prior to the academic year 2008 – 2009 will be permitted to appear for the examinations under those Regulations for a period of TWO years i.e. up to and inclusive of April/May 2012 Examinations. Thereafter, they will permitted to appear for the examination only under the Regulations then in force.

Question Paper Pattern

SECTION – A (30 words)
10 OUT OF 12   -   10 X 2 marks = 20 marks

SECTION – B (200 words)
5 out of 7   -   5 x 5   marks = 25 marks

SECTION – C (500 words)
3 out of 5   -   3x 10 marks   =   30 marks

                        TOTAL   =   **75 marks**

QUESTION PAPER FOR PRACTICALS

The external examiner will prepare a question paper on the spot with the help of the Question Bank supplied by the Controller's office.

APPENDIX – A

ADDITIONAL ELIGIBILITY CONDITIONS FOR

ADMISSION TO THE FOLLOWING COURSES

(1) CANDIDATES FOR ADMISSION TO THE FOLLOWING COURSES SHALL HAVE PASSED THE QUALIFYING EXAMINATION WITH THE SUBJECTS NOTED AGAINST EACH:

    (i)   COMPUTER SCIENCE   :   COMPUTER SCIENCE/
                                                     MATHEMATICS/STATISTICS/
                                                     BUSINESS MATHEMATICS/
                                                   COMMMERCE

.

PROVISION FOR LATERAL ADMISSION FOR BACHELOR OF COMPUTER APPLICATION (B.C.A)

Candidates with Diploma (3 years) in Computer Science and Engineering or Electrical and Electronics Engineering or Electronic and Communication Engineering awarded by Director of Technical Education, Government of Tamil Nadu or any other Diploma as equivalent thereto, shall be admitted to the Second year of the B.C.A Degree Course.

APPENDIX - B

COURSE OF STUDY

The Course of Study shall comprise the study of Part-I to Part-V Courses; .

PART - I   TAMIL/OTHER LANGUAGES comprise the study of:

Tamil or any one of the following Modern (Indian or Foreign) or classical languages at the optional candidate, according to the syllabi and text-books prescribed from time to time.

(i)	Modern (Indian)	- Telugu, Kannada, Malayalam, Urdu & Hindi.
(ii)	Foreign	-Chinese, French, German, Italian, Japanese, & Russian
(iii)	Classical	- Sanskrit, Arabic & Persian.

AND

PART – II   ENGLISH according to the syllabi and text-books prescribed from time to time.

PART – III CORE COURSES Comprise the study of (A) Main Subjects; (B) Allied Subjects; (C) Project / Electives with three courses:

(A) MAIN SUBJECTS:

Each candidate shall choose any one of the following Main Subjects [core courses] under the FACULTY OF SCIENCE:

01. B.C.A. BACHELOR OF COMPUTER APPLICATIONS

(B) ALLIED SUBJECTS:

Each candidate shall choose the Allied subjects prescribed in the Scheme of Examinations.

(C) PROJECT / ELECTIVES with Three Courses

PART – IV

1.(a)   Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two course (level will be at 6th Standard).

(b)   Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Advanced Tamil comprising of two courses.

(c)   Others who do not come under a + b can choose non-major elective comprising of two courses.

2.   SKILL BASED SUBJECTS (ELECTIVE) - (SOFT SKILLS)

3.   ENVIRONMENTAL STUDIES

4   VALUE EDUCATION

PART – V   EXTENSION ACTIVITIES

BACHELOR OF COMPUTER APPLICATION
FIRST SEMESTER

SUBJECTS	CREDITS	EXAM HRS	MAX. MARKS		
			External	Internal	TOTAL
PART I LANG.PAPER I	3	3	75	25	100
PART II ENGLISH PAPER I	3	3	75	25	100
PART III Fundamentals of Digital Computers	4	3	75	25	100
PART III Practical – I : PC Software Lab	4	3	60	40	100
Allied – Paper – I Mathematics	5	3	75	25	100
PART IV 1.(a) Not studied Tamil upto xii std., - shall take tamil compromising of two courses (level VI std.,) (b) Studied Tamil upto xii std. – taken Non-Tamil under Part – I shall take advance Tamil comprising of two courses. 9c) Others who do not comes under a & b can choose non-major elective comprising of two courses. 2. Skill based subject (Elective) (Soft Skills)	2 3	3 3	75 60	25 40	100 100

SECOND SEMESTER

SUBJECTS	CREDITS	EXAM HRS	MAX. MARKS		
			External	Internal	TOTAL
PART I LANG.PAPER-I I	3	3	75	25	100
PART II ENGLISH PAPER -I I	3	3	75	25	100
PART III Programming in C	4	3	75	25	100
PART III Practical II – Programming in C Lab	4	3	60	40	100
Allied – Paper – II Mathematics	5	3	75	25	100
PART IV 1.(a) Not studied Tamil upto xii std., - shall take tamil compromising of two courses (level VI std.,) (b) Studied Tamil upto xii std. – taken Non-Tamil under Part – I shall take advance Tamil comprising of two courses. 9c) Others who do not comes under a & b can choose non-major elective comprising of two courses. 2. Skill based subject (Elective) (Soft Skills)	2	3	75	25	100
	3	3	60	40	100

THIRD SEMESTER

Course Component	SUBJECTS	Credit	Exam Hrs.	MAX. MARKS		
				Ext. Marks	Int. Marks	Total
PART III	Paper-V - Programming in C++ and Data Structures	4	3	75	25	100
PART III	Paper-VI - Microprocessors and its Applications	4	3	75	25	100
PART III	Paper-VII -Numerical and Statistical Methods	4	3	75	25	100
PART III	Paper-VIII - Practical-III : Programming in C++ using Data structures	3	3	60	40	100
Allied subject	Paper-III - Financial Accounting	4	3	75	25	100
PART –IV 2.Soft Skill –III		3	3	60	40	100
3.Environmental Studies			Examination will be held in IV Semester.			

FOURTH SEMESTER

Course Component	SUBJECTS	Credit	Exam Hrs.	MAX. MARKS		
				Ext. Marks	Int. Marks	Total
PART III	Paper-IX - Programming in Java	4	3	75	25	100
PART III	Paper-X - Operating System	4	3	75	25	100
PART III	Paper-XI - Computer Graphics	4	3	75	25	100
PART III	Paper-XII - Practical-IV: Java Programming Lab	3	3	60	40	100

Allied-Subject	Paper-IV - Cost and Management Accounting	4	3	75	25	100
PART - IV 2. Soft Skill –IV		3	3	60	40	100
3.Environmental Studies		2	3	75	25	100

FIFTH SEMESTER

Course Component	SUBJECTS	Credit	Exam Hrs.	MAX. MARKS		
				Ext. Marks	Int. Marks	Total
PART III	Paper-XIII - Database Management System	4	3	75	25	100
PART III	Paper-XIV - Software Engineering	4	3	75	25	100
PART III	Paper-XV - Resource Management Techniques	4	3	75	25	100
PART III	Paper-XVI - Practical-V : RDBMS Lab	4	3	60	40	100
Elective –I		4	3	75	25	100
Value Education		2		75	25	100

SIXTH SEMESTER

	SUBJECTS	Credit	Exam Hrs.	MAX. MARKS		
				Ext. Marks	Int. Marks	Total
PART III	Paper-XVII - Web Technology	5	3	75	25	100
PART III	Paper-XVIII - Data Communication and Networking	4	3	75	25	100
PART III	Paper-XIX - Software Testing	4	3	75	25	100
PART III	Paper-XX – Practical-VI : Web Application Lab	4	3	60	40	100
Elective –II		3	3	75	25	100
Elective –III		4	3	75	25	100
PART- V Extension Activities		1		75	25	100

Elective I :   Visual Programming   (or)

　　　　　　　 RDBMS with ORACLE (or)

　　　　　　　 Unix Programming

Elective II :   Data Mining (or)

　　　　　　　 E-Commerce (or)

　　　　　　　 Object Oriented Analysis and Design

Elective III :   Multimedia Systems   (or)

　　　　　　　 Client Server Computing (or)

　　　　　　　 Distributed Computing

B.C.A. DEGREE COURSE COMPUTER APPLICATIONS
SYLLABUS

Title of the Course/ Paper	Fundamentals Of Digital Computers		
Core	I Year & First Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of computers and fundamentals of Digital Principles		

Unit 1: Fundamentals of computers – Characteristics of computers – Computer Language – Operating Systems – Generation of Computers.

Unit-2: Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.

Unit 3: Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method

Unit-4: Sequential logic – RS, JK, D and T Flip flops - Registers –Shift Registers - Counters – Ripple Counters – Synchronous Counter – Design of Counters

Unit-5 : Adders – Subtractors – Decoders – Encoders – Multiplexer - Demultiplexer – Design of Circuits using decoders/Multiplexers – ROM – PLA – Designing circuits using ROM/PLA Design of Arithmetic circuit – Design of logic circuit- Design of ALU – Design of Accumulator

1.Recommended Texts

i. M.M. Mano, Digital Logic and Computer Design, Pearson Education .
ii. V.Rajaraman,2002, Fundamentals of Computers, Third Edition,
   PHI, New Delhi.
iii .T.C.Bartee,1991,Computer Architecture and logical Design, McGraw Hill.

Reference Books

i. Rafiquzzaman, Mohamed. *Fundamentals of digital logic and microcomputer design*. John Wiley & Sons, 2005.

ii. Boyce, Jefferson C. *Digital computer fundamentals*. Prentice Hall PTR, 1977.

Title of the Course/ Paper	PC Software Lab		
Core	I Year & First Semester	Credit: 4	
Objective of the course	This course gives an exposure to Various Software of Office Package		

MSWORD

1. Text Manipulations.
2. Usage of Numbering, Bullets, Footer and Headers.
3. Usage of Spell check, and Find & Replace.
4. Text Formatting.
5. Picture insertion and alignment.
6. Creation of documents, using templates.
7. Creation templates
8. Mail Merge Concepts
9. Copying Text & Pictures from Excel

MS-EXCEL

10. Cell Editing
11. Usage of Formulae and Built-in Functions
12. File Manipulations
13. Data Sorting (both number and alphabets)
14. Worksheet Preparation
15. Drawing Graphs
16. Usage of Auto Formatting

POWER POINT

17. Inserting Clip arts and Pictures
18. Frame movements of the above
19. Insertion of new slides
20. Preparation of Organisation Charts
21. Presentation using Wizards
22. Usage of design templates

Title of the Course/ Paper	Programming in C		
Core	I Year & Second Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of C programming		

Unit 1: Fundamental Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

Unit-2:Data input output functions - Simple C programs - Flow of control   if, if else, while, do-while , for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

Unit 3: Functions –Definition - proto-types - Passing arguments – Recursions- Storage Classes - Automatic, External, Static, Register Variables – Multi-file programs.

Unit-4: Arrays - Defining and Processing - Passing arrays to functions – Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures – Unions - Bit wise operations.

Unit-5:Pointers-Declarations- Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers – Files- Creating , Processing ,Opening and Closing a data file.

1. Recommended Texts

   i.E.Balaguruswamy, 1995,Programming in ANSI C, TMH Publishing Company Ltd.

   ii Gottfried,B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd.,
   New Delhi .

   iii.Kanetkar Y,1999, Let us C, BPB Publications., New Delhi.

2. Reference Books

   i.H. Schildt, 2004, The Complete Reference, 4th Edition, TMH

   ii Gottfried,B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd.,
   New Delhi .

   iii.Kanetkar Y,1999, Let us C, BPB Publications., New Delhi.

   iv. Kamthane,2002,Programming with ANSI & Turbo C , First Edition,Pearson
       Education , New Delhi

Title of the Course/ Paper	Programming in C Lab		
Core	I Year & Second Semester	Credit: 4	
Objective of the course	This course gives hands on training in C programming		

I   Summation of Series :

    1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in

    functions)

II   String Manipulation :

    1. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines

    2. Reverse a string & check for palindrome.

    3. Substring detection, count and removal

    4. Finding and replacing substrings

III   Recursion :

    1. $^n P_r$, $^n C_r$

    2. GCD of two numbers

    3. Fibonacci sequence

    4. Maximum & Minimum

    5. Towers of Hanoi.

IV   Matrix Manipulation :

    1.Addition & Subtraction

    2.Multiplication

    3.Transpose, and trace of a matrix

    4.Determinant of a Matrix

    5.Inverse of Matrix

V   Sorting and Searching :

   18. Insertion Sort

   19. Bubble Sort

   20. Linear Search

   21. Binary Search

Title of the Course/	Paper –V PROGRAMMING IN C++ AND DATA STRUCTURES		
Core	II Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C++ and Data Structures		

Unit 1: Introduction to C++; Principles of Object Oriented Programming: basic concepts and benefits of OOP - object oriented language - application of OOPS -Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Pointers - Functions in C++ - Main Function - Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions

Unit-2: Classes and Objects; Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading. Inheritance : Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance.   Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.

Unit 3: Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments. Data Structures: Definition of a Data structure - primitive and composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.

Unit-4: Stacks - Applications of Stack - Infix to Postfix Conversion, Recursion, Maze Problems - Queues - Operations on Queues, Queue Applications, Circular Queue. Singly Linked   List - Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations, Applications

Unit-5 : Trees and Graphs: Binary Trees - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Types of Graphs, Hashing Tables and Hashing Functions, Traversal - Shortest Path; Dijkstra's Algorithm.

1. Recommended Texts

i. E. Balagurusamy,1995,Object Oriented Programming with C++, Tata McGraw-Hill
   Publishing Company Ltd.

ii..E.Horowitz and S.Shani,1999,Fundamentals of Data Structures in C++ , Galgotia Pub.

iii.R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C,
   PHI.

iv.Cangsam,Auguenstein,Tenenbaum,Data Structures using C & C++,PHI

2.Reference Books

i. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.

ii.. H.Schildt, C++,1998,The Complete Reference-1998-TMH Edition, 1998

iii.R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C,
   PHI.

iv.Cangsam,Auguenstein,Tenenbaum,Data Structures using C & C++,PHI

 iv.   D.Samantha,2005, Classic Data Structures, PHI,New Delhi.

Title of the Course/	Paper - VI - MICROPROCESSORS AND ITS APPLICATIONS		
Core	II Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Microprocessors.		

Unit 1: Introduction to microcomputers-microprocessor and assembly languages-microprocessor architecture and its operations-8085 MPU-8085 instruction set and classifications

Unit 2: Writing assembly level programs-programming techniques such as looping-counting and indexing addressing modes-data transfer instructions-arithmetic and logic operations-dynamic debugging

Unit 3:Counters and time delays-hexadecimal counter modulo 10 counter-pulse timings for flashing lights-debugging counter and time delay program-stack-subroutine-conditional call and return instructions

Unit 4:BCD to binary and binary to BCD conversions-BCD to HEX and HEX to BCD conversions-ASCII to BCD to ASCII conversions-BCD to seven segment LED code conversions-binary to ASCII and ASCII to binary conversions-multi byte addition-multi byte subtraction-BCD addition-BCD subtraction-multiplication and division

Unit 5:Interrupt-implementing interrupts-multiple interrupt 8085-trap-problems on implementing 8085 interrupt-DMA memory interfaces-RAM & ROM –I/O interface-direct I/O memory mapped I/O.

Recommended Texts

i. R.S.Ganokar-1990-Microprocessor architecture-Programming and Application with 8085/8080A-Wiley Eastern Limited.

ii. A.Mathur-1993-Introduction to Microprocessor-3rd Edition-Tata McGraw Hill.

Reference Book:

i.   Kumar, K. Udaya. *The 8085 Microprocessor: Architecture, Programming and Interfacing*. Pearson Education India, 2008.
ii.   Srinath, N. K. *8085 MICROPROCESSOR: PROGRAMMING AND INTERFACING*. PHI Learning Pvt. Ltd., 2005.
iii.   Godse, DA Godse AP. *Microprocessors & Microcontrollers*. Technical publications, 2007.

Title of the Course/	Paper - VIII Practical – III PROGRAMMING IN C++ USING DATA STRUCTURES		
Core	II Year & Third Semester	Credit: 3	
Objective of the course	This course deals with practical implementation of Data Structure using C++.		

1. Implement PUSH, POP operations of stack using   Arrays.

2. Implement PUSH, POP operations of stack using   Pointers.

3. Implement add, delete operations of a queue using Arrays.

4. Implement add, delete operations of a queue using Pointers.

5. Conversion of infix to postfix using stack operations

6. Postfix Expression Evaluation.

7. Addition of two polynomials using Arrays and Pointers.

8. Creation, insertion, and deletion in doubly linked list.

9. Binary tree traversals (in-order, pre-order, and post-order) using linked list.

10.Depth First Search and Breadth first Search for Graphs using Recursion

Title of the Course/	Paper-IX PROGRAMMING IN JAVA		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in JAVA		

Unit-1: Introduction to Java-Features of Java-Basic Concepts of Object Oriented Programming-Java Tokens-Java Statements-Constants-Variables-Data Types- Type Casting-Operators-Expressions-Control Statements: Branching and Looping Statements.

Unit-2:Classes, Objects and Methods - Constructors - Methods Overloading-Inheritance-Overriding Methods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-StringBuffer Class-Wrapper Classes

Unit-3: Interfaces-Packages-Creating   Packages-Accessing   a   Package-Multithreaded Programming-Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface

Unit-4: Managing Errors and Exceptions-Syntax of Exception Handling Code-Using Finally Statement-Throwing Our Own Exceptions-Applet Programming-Applet Life Cycle-Graphics Programming-Managing Input/Output Files: Concept of Streams-Stream Classes-Byte

Stream Classes-Character Stream Classes – Using Streams-Using the File Class-Creation of Files-Random Access Files-Other Stream Classes

Unit-5 : Network basics –socket programming – proxy servers – TCP/IP – Net Address – URL – Datagrams -Java Utility Classes-Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes- Working with Frames-Working with Graphics-Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Menus.

1. Recommended Texts

   i.   E. Balagurusamy ,2004,Programming with JAVA-2nd Edition, Tata McGraw-Hill Publishing Co.Ltd, New Delhi.

   ii. Herbert Schildt,The Complete Reference Java^{TM} , 2- 5th Edition,Tata McGraw-Hill Publishing Co. Ltd,New Delhi.

   iii. Y. Daniel Liang ,2003, An Introduction to JAVA Programming ,Prentice-Hall of India Pvt. Ltd.

2. Reference Books

   i.   Y. Daniel Liang ,2003, An Introduction to JAVA Programming ,Prentice-Hall of India Pvt. Ltd.

   ii. Cay S. Horstmann and Gary Cornell,2005,Core Java^{TM}2 Volume I,Fundamental 7th Edition,Pearson Education.

   iii. Deitel, Paul, and Harvey Deitel. *Java how to program*. Prentice Hall Press, 2011.

Title of the Course/	Paper-X OPERATING SYSTEMS		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the functions of operating systems.		

Unit 1: Introduction: Views –Goals –Types of system – OS Structure –Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads - Interprocess Communication. CPU Scheduling : CPU Schedulers – Scheduling criteria – Scheduling Algorithms

Unit-2:– Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock : Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.

Unit 3: Memory Management : Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation . Non Contiguous Allocation: Paging and Segmentation schemes – Implementation – Hardware Protection – Sharing – Fragmentation

Unit-4: Virtual Memory **::** Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure – Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management- File System –implementation – examples – case study UNIX, Linux, windows 2000

Unit-5 : I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures : Protection – Goals- Domain Access matrix – The security problem – Authentication – Threats – Threat Monitoring – Encryption..

1. **Recommended Texts**
    i.   Silberschatz A., Galvin P.B., Gange,. 2002 , Operating System Principles ,Sixth Edition, John Wiley & Sons.
    ii.   A.S. Godbole – Operating Systems – Tata McGraw Hill – 1999.
    iii. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley.

Reference book
    i.   Stallings, William. Operating Systems: Internals and Design Principles| Edition: 8. Pearson, 2014.
    ii.   Dhamdhere, Dhananjay M. Operating Systems: A Concept-based Approach, 2E. Tata McGraw-Hill Education, 2006.
    iii. Tanenbaum, Andrew S., and Herbert Bos. Modern operating systems. Prentice Hall Press, 2014.

Title of the Course/	Paper-XI COMPUTER GRAPHICS		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Computer Graphics.		

Unit-1: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.

Unit-2: Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms – Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions .

Unit-3: Two-Dimensional Transformations and Viewing: Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations–Other Transformations Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping and Sutherland – Hodgeman Polygon Clipping – Basic Modeling Concepts – Interactive Input Methods: Logical Classification of input Devices – Interactive Picture-Construction Techniques.

Unit-4: Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations - Key Frame systems – General animation functions - morphing.

Unit-5 : Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods – -Wireframe Methods.

1.Recommended Texts

i. D.Hearn and M.P. Baker, 2005, Computer Graphics , C Version,2nd Edition ,
Pearson Education , New Delhi.

ii. W.M. Newman and R.F. Sproull ,1997, Principles of Interactive Computer Graphics,
2^{nD} Edition,Tata McGraw-Hill Publishing Co. Ltd.

iii D.P. Mukherjee ,1999,Fundamentals of Computer Graphics and Multimedia , 1st
Edition,Prentice-Hall of India Pvt. Ltd

2. Reference Books

i. W.M.Newman and R.F.Sproull,1997,2nd Edition ,Principles of Interactive

   Computer Graphics, Tata McGraw-Hill Publishing Co. Ltd.

Ii .D.P.Mukherjee,1999,Fundamentals of Computer Graphics and Multimedia,

   1st Edition, Prentice-Hall of India Pvt. Ltd. – 1999.

iii .N. Krishnamurthy ,2002,Introduction to Computer Graphics, 1st Edition,

   Tata McGraw-Hill Publishing Co. Ltd..

iv. D.F.Rogers , 2001, Procedural Elements for Computer Graphics , 2nd Edition ,

   Tata McGraw-Hill Publishing Co. Ltd..

v.. Xiang and R.A. Plastock ,2002 ,Computer Graphics , Schaum's Outline

   Series, Tata McGraw-Hill Publishing Co.

Title of the Course/	Paper- XII JAVA PROGRAMMING LAB		
Core	II Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Java Programming		

APPLICATIONS:

1. Substring Removal from a String. Use String Buffer Class.

2. Determining the Perimeter and Area of a Triangle. Use Stream Class.

3. Determining the Order of Numbers Generated randomly using Random Class.

4. Usage of Calendar Class and Manipulation.

5. Implementation of Point Class for Image Manipulation.

6. String Manipulation Using Char Array.

7. Database Creation for Storing E-mail Addresses and Manipulation.

8. Usage of Vector Classes.

9. Interfaces and Packages

10. Implementing Thread based Applications and Exception Handling.

11. Application using Synchronization such as Thread based, Class based and Synchronized Statements.

12. Textfiles (copy, display, counting characters, words and lines)

13. Data file creating and processing for electricity billing.

14. Data file creating and processing for telephone billing

APPLETS:

15. Working with Frames and Various Controls.

16. Working with Dialog Box and Menus.

17. Working with Colors and Fonts.

18. Drawing various shapes using Graphical statements.

19. Working with panel and all types of Layout.

20. Design a simple calculator with minimal of 10 operations

21. Usage of buttons, labels, text components in suitable application

22. Usage of Radio buttons, check box ,choice list in suitable application

SEMESTER V

Title of the Course/	Paper-XIII DATABASE MANAGEMENT SYSTEMS		
Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of database management systems		

Unit-1: Advantages and Components of a Database Management Systems – Feasibility Study – Class Diagrams – Data Types – Events – Normal Forms – Integrity – Converting Class Diagrams to Normalized Tables – Data Dictionary - DBMS Models-The Hierarchical model-Network model-Relational model

Unit-2: Query Basics – Computation Using Queries – Subtotals and GROUP BY Command – Queries with Multiple Tables – Subqueries – Joins – DDL & DML – Testing Queries

Unit-3: Effective Design of Forms and Reports – Form Layout – Creating Forms – Graphical Objects – Reports – Procedural Languages – Data on Forms – Programs to Retrieve and Save Data – Error Handling.

Unit-4: Power of Application Structure – User Interface Features – Transaction – Forms Events – Custom Reports – Distributing Application – Table Operations – Data Storage Methods – Storing Data Columns – Data Clustering and Partitioning.

Unit-5 : Database Administration – Development Stages – Application Types – Backup and Recovery – Security and Privacy – Distributed Databases – Client/Server Databases – Web as a Client/Server System – Objects – Object Oriented Databases – Integrated Applications.

Recommended Texts

  i. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

  ii. Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.

  iii. C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley   - 2000

Reference Books

i.   Abraham silberschatz,H.FKorth And S.Sudarshan- Database System Concepts
     McGraw HillPublication.

ii. Ullman, Jeffrey D. Principles of database systems. Galgotia publications, 1984.

iii. Abiteboul, Serge, Richard Hull, and Victor Vianu. Foundations of databases: the
     logical level. Addison-Wesley Longman Publishing Co., Inc., 1995.

Title of the Course/	Paper -XIV SOFTWARE ENGINEERING		
Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Life Cycle of Software		

Unit-1: Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial issue. Planning a Software Project: Defining the problem – Developing a solution strategy – planning the development process – planning an organization structure – other planning activities

Unit-2: Software Cost Estimation: Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs.

Unit-3: Software requirements definition: The software requirements specification – formal languages and processors for requirements specification.

Unit-4: Software Design: Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection – Design guide lines

Unit-5 : Verification and validation techniques: Quality assurance – Static analysis – symbolic exception – Unit testing and Debugging – System testing – Formal verification.

Software maintenance: Enhancing maintainability during development – Managua aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques.

1. Recommended Texts

i. Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company.

ii. Rajib Mall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

iii. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.

2. Reference Books

i. Kotonya, Gerald, and Ian Sommerville. Requirements engineering: processes and techniques. Wiley Publishing, 1998.
ii. Leach, Ronald J. Introduction to software engineering. CRC Press, 2016.

Title of the Course/	Paper _XVI RDBMS LAB		
Core	III Year & Fifth Semester	Credit: 4	
Objective of the course	This course gives an exposure to visual programming using Visual Basic software.		

Creation of a Database and performing the operations given below using a Menu Driven Program.

a) Insertion b)Deletion c) Modification d) Generating a Simple report for the following:

1. Payroll
2. Mark sheet Processing
3. Saving Bank account for banking
4. Inventory System
5. Invoice system
6. Library information system
7. Student information system
8. Income tax processing system
9. Electricity bill preparation system
10. Telephone directory maintenance

ELECTIVE – I

Title of the Course/ Paper	VISUAL PROGRAMMING		
Elective	III Year & Fifth Semester	Credit: 4	
Objective of the course	To inculcate knowledge on Visual Basic concepts and Programming.		

Unit 1: Customizing a Form - Writing Simple Programs - Toolbox - Creating Controls - Name Property - Command Button - Access Keys - Image Controls - Text Boxes - Labels - Message Boxes - Grid - Editing Tools - Variables - Data Types - String - Numbers.

Unit-2: Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures.

Unit 3: Lists - Arrays - Sorting and Searching - Records - Control Arrays - Combo Boxes - Grid Control - Projects with Multiple forms - DoEvents and Sub Main - Error Trapping.

Unit-4: VB Objects - Dialog Boxes - Common Controls - Menus - MDI Forms - Testing, Debugging and Optimization - Working with Graphics.

Unit-5 : Monitoring Mouse activity - File Handling - File System Controls - File System Objects - COM/OLE - automation - DLL Servers - OLE Drag and Drop.

1. Recommended Texts

1. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill - 1999.
2. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill – 1999

Reference Book:

1. Schneider, David I. *An Introduction to Programming Using Visual Basic 2012*. Prentice Hall Press, 2013.
2. Thayer, Rob. *Visual Basic 6 Unleashed*. Sams, 1998.
3. Smith, Eric A., Hank Marquis, and Valor Whisler. *Visual Basic 6 Bible*. John Wiley & Sons, Inc., 1998.

Title of the Course/ Paper	RDBMS AND ORACLE	
Elective	III Year & Fifth Semester	Credit: 4
Objective of the course	To inculcate knowledge on RDBMS concepts and Programming with Oracle.	

Unit 1: 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 - Denormalization – Another Example of Normalization.

Unit-2: 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 3: 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-4: 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-5 : PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.

Recommended Texts

1. DATABASE SYSTEMS USING ORACLE – Nilesh Shah, 2nd edition, PHI.
2. DATABASE MANAGEMNET SYSTEMS – Arun Majumdar & Pritimoy Bhattacharya, 2007, TMH
3. DATABASE MANAGEMENT SYSTEMS – Gerald V. Post, 3rd edition, TMH.

Reference Books

1. Feuerstein, Steven, and Bill Pribyl. *Oracle Pl/SQL Programming*. " O'Reilly Media, Inc.", 2005.
2. Sumathi, Sai, and S. Esakkirajan. *Fundamentals of relational database management systems*. Vol. 47. Springer, 2007.

Title of the Course/ Paper	UNIX PROGRAMMING	
Elective	III Year & Fifth Semester	Credit: 4
Objective of the course	This course introduces fundamentals & programming of Unix basic concepts	

Unit 1: INTRODUCTION: File and common commands - Shell - More about files - Directories- Unix system - Basics of file Directories and filenames - Permissions - modes - Directory hierarchy - Devices - the grep family - Other filters - the stream editor sed - the awk pattern scanning and processing language - files and good filters.

Unit-2: CONCEPTS OF SHELL: Command line structure - Metacharacters - Creating new commands - Command arguments and parameters - program output as arguments - Shell variables - More on I/O redirection - loop in shell programs - Bundle - Setting shell attributes, Shift command line parameters - Exiting a command or the shell, evaluating arguments -

Executing command without invoking a new process - Trapping exit codes -- Conditional expressions.

Unit 3: SHELL PROGRAMMING: Customizing the cal command, Functions of command, While and Until loops - Traps - Catching interrupts - Replacing a file - Overwrite - Zap - Pick command - News command - Get and Put tracking file changes.

Unit-4: FEATURES IN UNIX: Standard input and output - Program arguments - file access - A screen at a time printer - On bugs and debugging - Examples - Zap - pick - Interactive file comparison program - Accessing the environment - Unix system calls - Low level I/O, File system Directories and modes, Processors, Signal and Interrupts

Unit-5 : PROGRAM DEVELOPMENT AND DOCUMENT PREPARATION:Program development - Four function calculator - Variables and error recovery - Arbitrary variable names, Built in functions, Compilation into a machine, Control flow and relational operators, Functions and procedures - Performance evaluation - Ms macro package - Troff level - Tbl and eqn preprocessors - Manual page - Other document preparation.

Recommended Texts

1. Brian W. Kernighan, Rob Pike - The UNIX Programming Environment - Prentice Hall of India(1984).
2. I. Steven Earhart - The UNIX System for MSDOS Users - Galgotia book source P. Ltd. (1990).
3. Stefen Prata - Advanced UNIX - A Programmer Guide.

Reference Book:

1. Raymond, Eric S. *The art of Unix programming*. Addison-Wesley Professional, 2003.
2. Kochan, Stephen G., and Patrick Wood. *UNIX shell programming*. Sams Publishing, 2003.
3. Arthur, Lowell Jay. *UNIX shell programming*. John Wiley & Sons, Inc., 1986

Title of the Course/	Paper-XVII	WEB TECHNOLOGY	
Core	III Year & Sixth Semester		Credit: 4
Objective of the course	This course introduces the concepts of ASP, VB Script, Java Script.		

Unit 1: Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object

Unit-2: Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box .

Unit 3: Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies.

Unit-4: ASP.NET Language Structure – Page Structure – Page event , Properties & Compiler Directives . HTML server controls – Anchor, Tables, Forms, Files . Basic Web server Controls – Label, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls – Check box list. Radio button list, Drop down list, List box, Data grid, Repeater.

Unit-5: Request and Response Objects, Cookies, Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives , error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates

1.Recommended Texts

i.I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.

ii.A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

iii. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning

iv. T.A. Powell, 2002,Complete Reference HTML , TMH.

2. Reference Books

i.   Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning

ii. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications

iii. T.A. Powell, 2002,Complete Reference HTML , TMH.

iv. J.Jaworski, 1999, Mastering Javascript, BPB Publications.

v. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH

Title of the Course/	Paper-XVIII DATA COMMUNICATION AND NETWORKING		
Core	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Networking		

Unit-1: Introduction to Data Communication, Network, Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.

Unit-2: Signals: Analog and Digital – Aperiodic – periodic Signals - Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface

standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

Unit-3: Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

Unit-4: History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM - ATM Topology - ATM Protocol.

Unit-5 : Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

Recommended Texts

i.I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.

ii. A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

iii. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning

T.A. Powell, 2002,Complete Reference HTML , TMH.

Reference Books

i. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning

Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications

ii. T.A. Powell, 2002,Complete Reference HTML , TMH.

iii. J.Jaworski, 1999, Mastering Javascript, BPB Publications.

iv Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH

Title of the Course/	Paper -XIX SOFTWARE TESTING		
Core	III Year & Sixth Semester	Credit:4	
Objective of the course	This course introduces the basic concepts of software testing		

Unit-1: Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

Unit-2: Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques

Unit-3: Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing .

Unit-4: Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases .

Unit-5 :   Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing

Recommended Texts

1. B. Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi.
2. K.V.KK. Prasad , 2005, Software Testing Tools, DreamTech. India, New Delhi.
3. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi

Reference Books

1. I. Burnstein, 2003, Practical Software Testing, Springer International Edn.
2. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
3. Mathur, Aditya P. "Foundations of software testing." *Copymat Services* (2006).

Title of the Course/	Paper –XX Practical – VI -WEB APPLICATIONS LAB		
Core	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives training in web design and applications.		

VB SCRIPT & JAVASCRIPT

1. Write a program outputs the squares, roots, cubes and complements of integers
   between 1 and 100.

2. Create a calculator.

3. Write a script to Sort numbers and strings

4. Create a program to generate a hit counter

5. Create a program to verify whether email address provided by user is valid or invalid.

6. Write a program to scroll the text on status bar.

7. The form consists of two multiple choice list and one single choice list

        a. the first multiple choice list display the major dishes available.

        b. the second Multiple choice list display the stocks available.

        c. The single choice list display the miscellaneous

            (Milkshakes, soft drinks, softy available etc.)

8. Write a sript to create a digital clock.

9. Create a web page using two image file which switch black and white one another as
    the mouse pointer moves over the image. Use the On Mouse over and On Mouse
    event, onDblclick handler

10. Build a WWW page with an image and 3 buttons., Pick three favorite graphics, Label
    the buttons and make each one swap in the graphic you have chosen

11. Create a frameset that has two frames, side by side.

    Make the left-hand frame contain a form with 3 radio buttons

    The buttons should be for three search engines:

        • Yahoo (http://www.yahoo.com)

        • Altavista (http://www.altavista.com)

- Infoseek (http://www.infoseek.com)

When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.

12.Write a program to implement Employee database with all validation

ASP

1. Create a login form, to expire, if the user does not type the password within 100 seconds

2. Create an employee database and manipulate the records using command object in ASP

3. Develop an application to illustrate the usage of Request and Response Objects in ASP.

4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.

5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.

7. Design an ASP application that describes books in the Online Bookshop.(Use AD Rotator Component, Content Rotator Component, Content Linking Component)

8. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).

9. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.

10. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

ELECTIVE – II

Title of the Course/	DATA MINING		
Core	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Data Mining.		

Unit-1: Introduction: Data mining – Functionalities – Classification –Introduction to Data Warehousing – Data Preprocessing : Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data reduction

Unit-2: Data Mining, Primitives, Languages and System Architecture: Data Mining – Primitives – Data Mining Query Language, Architectures of Data mining Systems. Concept Description,
Characterization and Comparison: Concept Description, Data Generalization and summarization, Mining Class Comparison

Unit-3: Mining Association Rules: Basics Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

Unit-4: Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification.Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.

Unit-5: Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Partitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method- Web mining- introduction- web content mining – web structure mining-web usage mining.

RECOMMENDED TEXT

i.J.Han and M. Kamber,2001,Data Mining Concepts andTechniques,Harcourt India Pvt. Ltd - New Delhi.

ii. M.H.Dunham,2003,Datamining: Introductory and Advanced topics, Pearson Education,Delhi.

Iiii Paulraj Ponnaiah,2001,Data warehousing fundamentals,Wiley publishers.

REFERENCE BOOKS

1. K.P. Soman , Shyam Diwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd – New Delhi.

2. Hand, David J., Heikki Mannila, and Padhraic Smyth. Principles of data mining. MIT press, 2001.

WEBSITE, E-LEARNING RESOURCES

i http:// www.academicpress.com

ii. http://www.mkp.com

Title of the Course/ Paper	E-COMMERCE		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives an exposure to the Electronic Commerce		

Unit-1: Electronic Commerce and Opportunities : Background The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview : Electronic Data Interchange.

Unit-2:. Approaches to Safe Electronic Commerce . Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)

Unit-3:. Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.

Unit-4:.Internet / Intranet Security Issues and Solutions : The Need for Computer Security – Specific Intruder Approaches – Security Strategies-
Security Tools – Encryption – Enterprise Networking and Access to the
Internet Antivirus Programs.- Security Teams

Unit-5: MasterCard/Visa Secure Electronic Transaction : Introduction –Business Requirements – Concepts – payment Processing.
 E-mail and secure e-mail technologies for Electronic Commerce: Introduction _ The Means of Distribution – A model for Message Handling- MIME, S/MIME, MOSS , MIME and Related Facilities for EDI over the Internet

Recommended Texts:
1. Daniel Minoli & Emma Minoli, "Web Commerce Technology Handbook". Tata McGraw Hill – 1999.
2. K.Bajaj & D Nag , "E-Commerce", Tata McGraw Hill – 1999.
3. Mamta Bhusry – "E-Commerce"

Reference Book:
i.   Ravi Kalakota and Andrew B. Whinston, Eleventh Impression, 2011,, Frontiers of Electronic Commerce, Pearson Education Inc., Delhi.
ii.   Marilyn Greenstein, Todd M Feinman - Electronic Commerce - Tata McGraw Hill - 2000.

Title of the Course/ Paper	OBJECT ORIENTED ANALYSIS AND DESIGN		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces to UML, object oriented analysis and design of any application		

Unit-1: System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

Unit-2: Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and Object responsibilities - Case Studies.

Unit-3: Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.

Unit-4: User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

Unit-5 : Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Recommended Texts

1. Ali Bahrami - Object Oriented Systems Development - McGraw Hill International Edition - 1999.
2. Grady Booch- Object Oriented Analysis and design –Addison Wesley.

3. Mala, D. Jeya. *Object Oriented Analysis and Design Using UML*. Tata McGraw-Hill Education, 2013.

Reference Book:

1. Ramnath, Sarnath, and Brahma Dathan. *Object-oriented analysis and design*. Springer Science & Business Media, 2010.
2. Kahate, Atul. *Object Oriented Analysis & Design*. Tata McGraw-Hill Education, 2004

<center>**ELECTIVE III**</center>

Title of the Course/ Paper	MULTIMEDIA SYSTEMS		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Multimedia and its applications.		

Unit-1: What is Multimedia: Definitions - CD-ROM and the Multimedia Highway - Where to use Multimedia - Introduction to Making Multimedia: The stages of a Project - What You Need - Multimedia Skills and Training: The team - Macintosh and Windows Production Platforms: Macintosh Versus PC - The Macintosh Platform - The Windows Multimedia PC Platform - Networking Macintosh and Windows Computers- Hardware Peripherals: Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.

Unit-2: Basic Tools: Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image-Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Processors - Spreadsheets - Databases - Presentation Tools. Multimedia Authoring Tools: Types of Authoring Tools - Card-and-Page-Based Authoring Tools - Icon-Based Authoring Tools - Time-Based Authoring Tools - Object-Oriented Authoring Tools - Cross-Platform Authoring Notes

Unit-3: Text: The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Audio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your Multimedia Project - Toward Professional Sound: The Red Book Standard - Production Tips

Unit-4: Images: Making Still Images -Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work - Video: Using Video -

How Video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video.

Unit-5:. Planning and Costing : Project Planning - Estimating - RFPs and Bid Proposals - Designing and Producing : Designing - Producing - Content and Talent : Acquiring Content - Using Content Created by Others - Using Content Created for a Project - Using Talent - Delivering : Testing - Preparing for Delivery - Delivering on CD-ROM - Compact Disc Technology - Wrapping It Up - Delivering on the World Wide Web.

Recommended Texts:

a. Tay Vaughan - Multimedia: Making it Work. - Fourth Edition - Tata McGraw Hill Edition - 1999.

b) Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.

c) John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

Reference

1.	Gokul, S. "Multimedia Magic." (2002): 81-7029.

Title of the Course/ Paper	CLIENT / SERVER COMPUTING		
Elective	III Year & Sixth Semester	Credit:4	
Objective of the course	This Subject deals with the C/S Computing, GUI.		

Unit-1: Introduction to Client/Server Computing – What is Client/Server Computing – Benefits of Client/Server Computing – Evolution of C/S Computing – Hardware Trends – Software   Trends-Evolution of Operating Systems – N/w Trends – Business Considerations.

Unit-2: Overview of C/S Applications: Components of C/S Applications – Classes of C/S Applications – Categories of C/S Applications . Understanding C/S Computing : Dispelling the Myths – Obstacles – Upfront & Hidden – Open Systems & Standards – Standards – Setting Organizations – Factors of Success.

Unit-3: The Client Hardware & Software : Client Component – Client Operating Systems – What is GUI – Database Access – Client Software Products : GUI Environments – Converting 3270/5250 Screens – Database Tools – Client Requirements : GUI Design Standards – Open GUI Standards – Interface Independence – Testing Interfaces .

Unit-4: The Server : Categories of Servers – Features of Server Machines – Classes of Server Machines – Server Environment : N/W Management Environment – N/W Computing Environment – Extensions – Network Operating System – Loadable Module.

Unit-5 : Server Operating System : OS/2 2.0 – Windows New Technology – Unix Based OS – Server Requirements : Platform Independence – Transaction Processing – Connectivity – Intelligent Database – Stored Procedure – Triggers – Load Leveling – Optimizer – Testing and Diagnostic Tools – Backup & Recovery Mechanisms.

1. Recommended Texts

1.Patrick Smith & Steave Guengerich, "Client/Server Computing". PHI

2. Dawna Travis Devire, "Client/Server Computing". TMH

Reference Book:

1. Elbert, Bruce R. Client/server computing: architecture, applications, and distributed systems management. Artech House Publishers, 1994.
2. Smith, Patrick. Client/server computing. Sams, 1994.
3. Subhash, Chandra Yadav. Introduction To Client Sever Computing. New Age International, 2009.

Title of the Course/ Paper	DISTRIBUTED COMPUTING		
Elective	III Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Distributed databases and Distributed File system and its Hardware concepts..		

Unit-1: Distributed data base – Security and Integrity – New Data base application – Design of data bases – Knowledge based case studies for relational network and hierarchical systems.

Distributed processing – Models for distributed computing – Load balancing – Remote procedure calls – process migration – concurrency issues on data bases.

Unit-2: Hardware concepts – Switched multiprocessor, Bus based multicomputers, Switched multicomputers – Software concepts – Network operating systems and NFS – Time distributed systems.- Design Issues : Transparency – Flexibility – Reliability – performance and scalability.

Unit-3: Communications in distributed systems – The client – server model, Blocking vs Unbuffered primitives - Implementation of client-server model.

Unit-4: Synchronization in distributed systems – Clock synchronization – Mutual exclusion – Election algorithms – Atomic transactions – Deadlocks in distributed system – Threads – Thread usage and Implementation of thread packages – processor allocation.

Unit-5 : Distributed File system : File service interface – semantics of the file sharing – Distributed file system – Implementation of new trends in distributed file systems.

1.Recommended Texts

i. A.S Tanenbaum, " Modern Operating Systems " , Pearson Education

2.. Reference Books

1. James Martin, " Computer Networks and Distributed Processing, Software Techniques and Architectures", Pearson Education.
2. Garg, Vijay K. *Elements of distributed computing*. John Wiley & Sons, 2002.
3. Garrido, José M., and Richard Schlesinger. *Principles of modern operating systems*. Jones & Bartlett Learning, 2008.