B.Sc. DEGREE COURSE IN COMPUTER SCIENCE

SYLLABUS

I BSC : SEM 1

Title of the Course/ Paper	Programming in C SUBCODE: SAE1A		
Core	I Year & First Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C		
Course outline	Unit 1: C fundamentals 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 : Pinters - 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.
2. Reference Books
 i.B.W. Kernighan and D.M.Ritchie, 1988,The C Programming Language, 2nd Edition, PHI.
 ii.H. Schildt, C,2004, The Complete Reference, 4th Edition, TMH
 iii. Gottfried,B.S, 1996,Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi .
 iv. Kanetkar Y., 1999,Let us C, BPB Pub., New Delhi.

I BSC: SEM1 PRACTICALS

Title of the Course/ Paper	Practical – I Programming in C SUBCODE: SAE11		
Core	I Year & First Semester	Credit: 4	
Objective of the course	This course train the students to solve the problems using C language		

Course outline	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
	 V Sorting and Searching :
	     1. Insertion Sort
	     2. Bubble Sort
	     3. Linear Search
	     4. Binary Search		

UNIVERSITY OF MADRAS
B.Sc. DEGREE COURSE
(Effective from the Academic Year 2015-16)
(For B. Sc Physics, Physics with Computer Application, Chemistry, Bio-Chemistry, Electronic Science,
Geophysics, Computer Science and Computer Application (BCA) Major only)

Duration of Examination: 3 hrs
Maximum Marks: 100; Credits: 4   <u>**REVISED SYLLABUS**</u>

Semester I - Allied Paper I - Mathematics - I

UNIT – I   ALGEBRA AND NUMERICAL METHODS:

Algebra: Summation of series simple problems.
Numerical Methods: Operators E, Δ, ∇, difference tables, Newton-Raphson method Newton's forward and backward interpolation formulae for equal intervals, Lagrange's interpolation formula.

UNIT- II   MATRICES:

Symmetric, Skew-Symmetric, Orthogonal, Hermetian, Skew-Hermetian and Unitary matrices. Eigen values and Eigen-vectors, Cayley-Hamilton theorem (without proof) – verification- Computation of inverse matrix using Cayley - Hamilton theorem.

UNIT- III   THEORY OF EQUATIONS:

Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equation. Newton's method to find a root approximately - simple problems.

UNIT IV   TRIGONOMETRY:

Expansions of $\sin n\theta$ and $\cos n\theta$ in a series of powers of $\sin\theta$ and $\cos\theta$ - Expansions of $\sin^n\theta$, $\cos^n\theta$, $\tan^n\theta$ in a series of sines, cosines and tangents of multiples of "θ" - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of powers of "θ" – Hyperbolic and inverse hyperbolic functions - Logarithms of complex numbers.

UNIT V   DIFFERENTIAL CALCULUS:

Successive differentiation, n^{th} derivatives, Leibnitz theorem (without proof) and applications, Jacobians, Curvature and radius of curvature in Cartesian co-ordinates, maxima and minima of functions of two variables, Lagrange's multipliers - Simple problems

Book for Reference:

1. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.
2. P. Duraipandian and S.Udaya Baskaran, Allied Mathematics, Vol. I & II Muhil Publications Chennai

I BSC: SEM2

Title of the Course/ Paper	Digital Electronics & Microprocessors SUBCODE: SAE2B

Core	I Year & Second Semester	Credit: 4	
Objective of the course	This course introduces the concepts of fundamentals of Digital Electronics and Microprocessor.		
Course outline	Unit 1: Binary Systems & Code conversion,Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: SOP, POS methods – K-map, – Combinational Logic: Adders &Subtractors – Multiplexer – Demultiplexer - Encoder – Decoder.		
	Unit-2: Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers – Counters: Ripple Counter – Synchronous Counters – Up-Down Counter.		
	Unit 3: Introduction to Microprocessors, Microcomputers, and Assembly Language – Microprocessor Architecture and Its Operations – Memory – I/O Devices – 8085 MPU – Introduction to 8085 Instructions – Data Transfer Operations – Addressing Modes - Arithmetic, Logic and Branch Operations – Writing Assembly Language Programs .		
	Unit-4:Time Delay Programs: Time Delay Using One Register – Using a Register Pair – Using a Loop within Loop Technique – Counter Design with Time Delay – Stack and Subroutines – BCD to Binary Conversion and Vice-versa – BCD to HEX Conversion and Vice-versa – Binary to ASCII Conversion and Vice-versa – BCD Addition and Subtraction .		
	Unit-5 : 8085 Interrupt – Vectored Interrupts – Interfacing I/O Devices: Basic Interfacing Concepts – Interfacing Input Devices- Memory-Mapped I/O.		

1. Recommended Texts

i.M. Morris Mano,2005, Digital Logic and Computer Design, Prentice-Hall of India Pvt. Ltd.

ii. Ramesh S. Gaonkar,1999,Microprocessor Architecture, Programming, and Applications with the 8085, 5thEdition,Penram International Publishing (India) Pvt. Ltd.

2. Reference Books

i. D. P. Leach and A. P. Malvino,2002,Digital Principles and Applications,5th Edition, Tata McGraw, Hill Publishing Co. Ltd.

ii. V. Vijayendran,2004,Digital Fundamentals,S. Viswanathan (Printers & Publishers) Pvt. Ltd.

iii. V. Vijayendran ,2004, Fundamentals of Microprocessor – 8085, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

iv. N. K. Srinath,2005, 8085 Microprocessor Programming and Interfacing,Prentice-Hall of India Pvt. Ltd.

I BSC: SEM2 PRACTICALS

Title of the Course/ Paper	Practical II - Digital Electronics & Microprocessors Lab SUBCODE: SAE22

Core	I Year & Second Semester	Credit: 4	
Objective of the course	This course gives training on the experiments of Digital Electronics and Microprocessor 8085.		
Course outline	**DIGITAL ELECTRONICS:** 1. Verification of Truth Table for AND, OR, NOT, NAND, NOR and EX-OR gates. 2. Realisationof NOT, AND, OR, EX-OR gates with only NAND and only NOR gates. 3. Karnaugh Map Reduction and Logic Circuit Implementation. 4. Verification of DeMorgan's Law. 5. Implementation of Half-Adder and Half-Subtractor. 6. Implementation of Full-Adder and Full-Subtractor. 7. Four Bit Binary Adder 8. Four Bit Binary Subtractor using 1's and 2's Complement. **MICROPROCESSOR:** 1. 8 Bit Addition and Subtraction. 2. 16 Bit Addition. 3. BCD Addition . 4. BCD Subtraction. 5. 8 Bit Multiplication. 6. BCD Multiplication. 7. 8 Bit Division. 8. Searching for an Element in an Array. 9. Sorting in Ascending and Descending Orders. 10. Finding Largest and Smallest Elements from an Array. 11. Reversing Array Elements. 12. Block Move.		

Semester II - Allied Paper II - Mathematics - II
SUBCODE: SBAMN

Unit-I   INTEGRAL CALCULUS:

Bernoulli's formula. Reduction formulae - $\int_o^{\frac{\pi}{2}} sin^n x dx$, $\int_o^{\frac{\pi}{2}} cos^n x dx$, $\int_o^{\frac{\pi}{2}} sin^m x cos^n x dx$ (m, n being positive integers), Fourier series for functions in (α, $\alpha+2\pi$), Half range sine and cosine series

Unit-II   DIFFERENTIAL EQUATIONS

Ordinary Differential Equations: second order non- homogeneous differential equations with constant coefficients of the form ay" +by'+ cy = X where X is of the form $e^{\alpha x} cos\beta x$ and $e^{\alpha x} sin\beta x$

Partial Differential Equations: Formation, complete integrals and general integrals, four standard types and solving lagrange's linear equation P p +Q q= R

Unit-III   LAPLACE TRANSFORMS:

Laplace transformations of standard functions and simple properties, inverse Laplace transforms, Application to solution of linear differential equations up to 2nd order- simple problems.

Unit – IV   VECTOR DIFFERENTIATION

 Introduction, Scalar point functions, Vector point functions, Vector differential operator∇, Gradient, Divergence, Curl, Solenoidal, irrotational, identities.

Unit – V   VECTOR INTEGRATION

Line, surface and volume integrals, Gauss, Stoke's and Green's theorems (without proofs). Simple problems on these.

Book for Reference:

1. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.
2. P. Duraipandian and S.Udaya Baskaran, Allied Mathematics, Vol. I & II Muhil Publications Chennai

II BSC: SEM3

Title of the Course/	**Paper –V PROGRAMMING IN C++ AND DATA STRUCTURES**

	SUBCODE: SAE3A		
Core	**II Year & Third Semester**	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C++ and Data Structures		
Course outline	Unit 1: Introduction to C++; 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.

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.
iii.Cangsam,Auguenstein,Tenenbaum,Data Structures using C & C++,PHI
iv.D.Samantha,2005, Classic Data Structures, PHI,New Delhi.

II BSC: SEM3 PRACTICALS

Title of the Course/	**Paper VI PRACTICAL – III DATA STRUCTURES USING C++**

	SUBCODE: SAE31		
Core	**II Year & Third Semester**	Credit: 4	
Objective of the course	This course deals with practical implementation of Data Structure using C++.		
Course outline	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.		

Duration of Examination: 3 hrs
Maximum Marks: 100; Credits: 4

Allied Paper I - Statistical Methods and Their Applications I (4 credits)

(6hrs theory+2 hours practical)

Subcode : SBAOC

Note: *The emphasis is solely upon the understanding and practice of statistical methods, with specific reference to problems in physical, natural, and earth sciences.*

UNIT - 1: Nature and scope of statistical methods and their limitations - Classification, tabulation and diagrammatic representation of various types of statistical data - Frequency curves and Ogives - Graphical determination of percentiles, quantiles and their uses, Lorenz curve.

UNIT - 2: Sampling from finite population - Simple random sampling, Stratified and systematic random sampling procedures - Estimation mean and total and their standard errors. Concepts of sampling and non-sampling errors.

UNIT - 3: Measures of location - Arithmetic mean, median, mode, Geometric mean, Harmonic mean and their properties - -merits and demerits. Measures of dispersion - Range, mean deviation, quartile deviation, standard deviation, coefficient of variation, skewness and kurtosis - and their properties.

UNIT - 4: Probability of an event - Finitely additive probability space addition and multiplication theorems - Independence of events - conditional probability - Bayes' theorem.

UNIT - 5: Bivariate frequency table and its uses - scatter diagram – Correlation and Regression lines - linear prediction - Rank correlation coefficient - curve fitting by the method of least squares- Partial and multiple correlation coefficients.

Books for Study References:

Mode, E.B.: Elements of Statistics - Prentice Hall

Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH

Snedecor, G.W., & Cochran, W.G.(1967): Statistical Methods, Oxford and IBH

Simpson and Kafka: Basic Statistics

Burr, I.W.: Applied Statistical Methods, Academic Press.

Croxton, F.E. and Cowden, D.J.: Applied General Statistics, Prentice Hall

Ostleo, B.: Statistics in Research, Oxford & 1BH.

II BSC: SEM4

Title of the Course/	**Paper –VII - PROGRAMMING IN JAVA SUBCODE:SAE4A**		
Core	**II Year & Fourth Semester**	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in JAVA		
Course outline	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-String Buffer 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.

ii.Herbert Schildt,2005,The Complete Reference Java^{TM}2, 5thEdition,Tata McGraw-Hill Publishing Co. 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-Fundamentals, 7th Edition- Pearson Education.

iii. Ken Arnold, James Gosling and David Holmes,2003, The Java^{TM} Programming Language, 3rd Edition, Pearson Education.

II BSC: SEM4 PRACTICALS

Title of the Course/	**Paper -VIII** **PRACTICAL – IV: JAVA PROGRAMMING LAB** **SUBCODE: SAE41**		
Core	**II Year & Fourth Semester**	Credit: 4	
Objective of the course	This course gives the practical training in JAVA programming		
Course outline	**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.		

Allied - Paper II - Statistical Methods and Their Applications II (4 Credits)
(6hrs theory+2 hours practical)
SUBCODE: SBAOD

Note: *The emphasis is solely upon the understanding and practice of statistical methods, with specific reference to problems in physical, natural, and earth sciences.*

UNIT - 1: Concepts of random variable - Mathematical expectation - Moments of random variable (raw and central moments) - Moment generating function - Chebycheff's inequality - simple problems.

UNIT - 2: Standard distributions - Binomial, Poisson and Normal distributions - Fitting of distributions.

UNIT - 3: Concept of sampling distributions - standard error - Tests of significance based on t, Chi-square arid F - distributions with respect to mean, variance and correlation coefficient. Theory of attributes and tests of independence in contingency table.

UNIT - 4: Principle of scientific experiments - Randomization, replication, and local control Analysis of variance - One way and two way classification Analysis of CRD and RBD - Latin square designs. Concepts of factorial experiments (without confounding).

UNIT – 5: Non parametric tests- Comparison between parametric and Non-parametric tests- Sign test- Runs test for one and two sample problems- Wilcoxon signed Rank test- Mann Whitney U test.

Books for Study and References:

Mode, E.B.: Elements of Statistics - Prentice Hall
Wilks, S.S.: Elementary Statistical Analysis -Oxford and IBH
Snedecor, G.W., & Cochran, W.G.: Statistical Methods, Oxford and IBH
Simpson and Kafka: Basic Statistics
Burr, I.W.: Applied Statistical Methods, Academic Press.
Croxton, FE. and Cowden, D.J.: Applied General Statistics, Prentice Hall
Ostleo, B.: Statistics in Research, Oxford & IBH.
Sydney Siegel- Non-parametric Methods for Behavioural Sciences.
Daniel, W W- Biostatistics.

Allied Paper III: Practical(2 credits)based on Statistical Methods and Their Applications I and II)

SUBCODE: SBAO2

NOTE: *Use of scientific calculator may be permitted for Statistics for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.*

1. Construction of univariate and bivariate frequency distribution with samples of size not proceeding 200.

2. Diagrammatic and graphical representation of various statistical data and frequency distributions.

3. Cumulative frequency curve and Lorenz curves.

4. Computation of various measures of location, dispersion, moments, skewness and kurtosis.

5. Curve fitting by the method of least squares.

(i) $y = ax + b$; (ii) $y = ax^2 + bx + C$; (iii) $y = ae^{bx}$ (iv) $y = ax^b$

6. Computation of correlation coefficients - regression lines (raw data and grouped data) - correlation coefficients, Partial and Multiple Correlation coefficients.

7. Fitting of Binomial, Poisson and Normal distributions and testing goodness of fit.

8. Large sample test - tests for proportions.

9. Exact test based on t, Chi-square, and F distributions with regard to mean, variance and correlation coefficients.

10. Estimation of mean and r total and their standard errors in simple, stratified and systematic random sampling procedure.

11. Analysis of variance - one-way and two-way classifications.

12. Analysis of CRD, RBD and Latin square designs.

    Non-parametric tests.

Title of the Course/	**Paper –IX - OPERATING SYSTEMS SUBCODE:SAE5A**		
Core	**III Year & Fifth Semester**	Credit: 4	
Objective of the course	This course introduces the functions of operating systems.		
Course outline	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:VirtualMemory **::** 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.		
	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.
2. Reference Books
i. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley.

Title of the Course/	**Paper - X -DATABASE MANAGEMENT SYSTEMS SUBCODE:SAE5B**		
Core	**III Year & Fifth Semester**	Credit: 4	
Objective of the course	This course introduces the basic concepts of database management systems		
Course outline	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.		
	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
1. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

Reference Books
1.RaghuRamakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.
2.C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000.

III BSC: SEM 5

Title of the Course/	Paper - XI - Computer Architecture and Organization SUBCODE:SAE5C		
Core	**III Year & Fifth Semester**	Credit: 4	
Objective of the course	This course introduces the architecture of various computers and its organization.		
Course outline	Unit 1: Computer Evolution: Pentium and Power PC Evolution. Computer System: Components – Function – Interconnection Structures – Bus Interconnection – Basics of PCI Bus. Memory: Characteristics – Hierarchy – Cache Memory – Principles – Cache Design – Locality of Reference.		
	Unit-2: Main Memory: Static RAM – Dynamic RAM – Types of ROM – Memory Chip Organization – Types of DRAM. External Memory: Magnetic Disk – Basics of RAID – Optical Memory – Magnetic Tapes		
	Unit 3: :Input/Output: External Devices – I/O Module – Programmed I/O – Interrupt Driven I/O – DMA – I/O Channels & Processors. Computer Arithmetic: ALU – Integer Representation and Arithmetic – Floating Point Representation and Arithmetic. Instruction Set: Characteristics – Operand Types – Operation Types – Addressing Modes – Instruction Formats – Pentium and Power PC Operands, Operations, Addressing Modes (Simple Examples).		
	Unit-4:CPU: Organization of Processors and Registers – Instruction Cycle – Instruction Pipelining – Pentium Processor. RISC: Characteristics – Large Register File – Register Optimization – Architecture – RISC Vs CISC Characteristics – Pipelining.		
	Unit-5: Control Unit: Micro-Operations – Control of Processors – Hardwired Implementation - Micro Programmed Control Concepts – Microinstruction Sequencing – General Microinstruction Execution.		

1. **Recommended Texts**
i.W. Stallings ,2003,Computer Organization and Architecture, 6th Edition- PHI,New Delhi.
2. Reference Books
i..C. Hamacher, Z. Vranesic, S.Zaky, 2002, Computer Organization,5thEdition,Mcgraw Hill.

III BSC: SEM 5 PRACTICALS

Title of the	Paper -XII - PRACTICAL – V: RDBMS LAB

Course/	**SUBCODE:SAE51**		
Core	**III Year & Fifth Semester**	Credit: 4	
Objective of the course	This course train the students to implement the database applications		
Course outline	Create database and performing the operations given below using a Menu Driven program: Insertion, (b)Deletion, (c)Modification, (d)Generating a reports (Simple) for the following Systems using any RDBMS package : Payroll Mark sheet Processing Savings bank account for banking Inventory System Invoice system Library information system Student information system Income tax processing system Electricity bill preparation system Telephone directory maintenance.		

ELECTIVE – I

III BSC : SEM 5

Title of the Course/ Paper	**VISUAL PROGRAMMING SUBCODE:SEE5A**		
Elective	**III Year & Fifth Semester**	Credit: 4	
Objective of the course	To inculcate knowledge on Visual Basic concepts and Programming.		
Course outline	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
Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill - 1999.
Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill – 1999

III BSC: SEM 6

Title of the Course/	**Paper-XIII** **DATA COMMUNICATION AND NETWORKING** **SUBCODE:SAE6A**

Core	**III Year & Sixth Semester**	Credit: 4	
Objective of the course	This course introduces the details about basic concepts of data communication and networking.		
Course outline	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: 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.		

1. **Recommended Texts**
i.Behrouz and Forouzan,2001,Introduction to Data Communication and Networking, 2ndEdition,TMH.
2. **Reference Books**
i.JeanWalrand 1998,Communication Networks (A first Course),Second Edition, WCB/McGraw Hill.
ii. Behrouz and Forouzan,2006,Data Communication and Networking,3nd Edition ,TMH.

III BSC : SEM 6

Title of the Course/	**Paper -XIV** **WEB TECHNOLOGY SUBCODE:SAE6B**		
Core	**III Year & Sixth Semester**	Credit: 4	

Objective of the course	This course introduces the concepts of ASP, VB Script , Java Script.
Course outline	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 – Lable, 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.

2. Reference Books

i. HathleenKalata, 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 edition2004, TMH

III BSC : SEM 6

Title of the Course/	**Paper - XV** **PRACTICAL – VI -WEB APPLICATIONS LAB** **SUBCODE:SAE61**		
Core	**III Year & Sixth Semester**	Credit: 5	

Objective of the course	This course gives training in web design and applications.
Course outline	

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.
    1. Make the left-hand frame contain a form with 3 radio buttons
    2. The buttons should be for three search engines:
            a.   Yahoo (http://www.yahoo.com)
            b.   Altavista (http://www.altavista.com)
            c.   Infoseek (http://www.infoseek.com)

    3. 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.

III BSC: SEM 6

Title of the Course/ Paper	**DATA MINING SUBCODE:SEE6H**		
Elective	**III Year & Sixth Semester**	Credit: 5	
Objective of the course	This course introduces the fundamental concepts of Data Mining.		

Course outline	Unit1: 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, Analytical Characterization, Mining Class Comparison – Statistical Measures.
	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 of Back Propagation. 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, Petitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

1. Recommended Texts
i.J.Han and M. Kamber,2001,Data Mining Concepts and Techniques,Harcourt India Pvt. Ltd - New Delhi.
2. Reference Books
i. K.P. Soman , ShyamDiwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.
3. Website, E-learning resources
i   http:// www.academicpress.com
   ii. http://www.mkp.com

III BSC: SEM 6

Title of the Course/ Paper	**COMPUTER GRAPHICS SUBCODE:SEE6E**		
Elective	**III Year & Sixth Semester**	Credit: 5	
Objective of the course	This course introduces the fundamental concepts of Graphics.		

Course outline	Unit 1: INTRODUCTION TO COMPUTER GRAPHICS :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:OUTPUT PRIMITIVES AND THEIR ATTRIBUTESLine-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 CONCEPTS: 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.
	Unit-5 : THREE-DIMENSIONAL VIEWING : 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- Light Sources – RGB,CMY and HLS Color Models – Computer Animation: Design of its Sequences and Languages.

1. Recommended Texts

i. D. Hearn and M.P. Baker,2005,Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint.

2.Reference Books

   i. S. Harrington,1987, Computer Graphics , 2nd Edition , McGraw-Hill Book Co.

  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.

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

     McGraw-Hill Publishing Co. Ltd.

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

     Tata McGraw-Hill Publishing Co. Ltd.

vi. Z. Xiang and R.A. Plastock,2002, Computer Graphics, Schaum's Outline Series,
Tata McGraw-Hill Publishing Co.