Shrimathi Devkunvar Nanalal Bhatt Vaishnav College For Women (Autonomous) , Chromepet, Chennai - 600 044.

BCA.

Overall Framework

S.No	Sem.	Paper/Allied	Title of the paper	Lecture Hours		Max. Marks			Cre-dits
				Th	Pr	In	Ex	Tot.	
1	I	Paper-I	Programming in C	8		25	75	100	3
2		Practical -I	Practical Paper-I		4	40	60	100	3
Total								**200**	**6**
3	II	Paper-II	Internet programming	8		25	75	100	3
4		Practical -II	Practical Paper-II		4	40	60	100	3
Total								**200**	**6**
5	III	Paper-III	COBOL Programming	4		25	75	100	4
6		Paper-IV	Object oriented programming in C++	5		25	75	100	4
7		Paper-V	Scientific computational methods	5		25	75	100	4
8		Practical-III	COBOL Programming		5	20	30	50	2
9		Practical-IV	C++ lab		5	20	30	50	2
Total								**400**	**16**
10	IV	Paper –VI	Computer Architecture	5		25	75	100	4
11		PaperVII	Database Management Systems	4		25	75	100	4

14		**Practical-VI**	**Tally and SPSS lab**		**5**	**20**	**30**	**50**	**2**

12		**Paper-VIII**	**Visual Programming**	**5**		**25**	**75**	**100**	**4**
13		**Practical-V**	**VB lab**		**5**	**20**	**30**	**50**	**2**

Total								400	16
15	V	Paper-IX	Programming in Java	5		25	75	100	4
16		Paper-X	Data Structures and algorithms	5		25	75	100	4
17		Paper XI	Operating Systems	5		25	75	100	4
18		Practical-VII	Java Programming lab		5	20	30	50	2
19		Practical-VIII	Data Structures with C++		5	20	30	50	2
20		Elective-I	Resource Management Techniques /Computer graphics / E-Commerce	5		25	75	100	5
T o t a l								**500**	**21**
21	VI	Paper-XII	Data Communication and Networking	5		25	75	100	4
22		Paper-XIII	Web Technology	5		25	75	100	4
23		Practical-IX	Web Technology lab		5	20	30	50	2
24		Practical –X	Practical based on Elective II		5	20	30	50	2
25		Elective-II	Unix and shell programming / Advanced Java / RDBMS with Oracle	5		25	75	100	5
26		Elective-III	Software Engineering /OOAD/ Software testing		5	40	60	100	5
T o t a l			**APPROVAL PENDING**					**500**	**22**
Grand Total								**2200**	**87**

Detailed Syllabus

Title of the Course/ Paper	*PAPER- I:- PROGRAMMING IN C*

Core	I Year I Semester		Credit: 3
Course outline	**Unit-1:**	C fundamental Character set – identifiers and keywords – data types –constants – variables –declaration –expression –statements – arithmetic, unary, relational and logical, assignment and conditional operator –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 - recursion. Storage classes - Automatic, External, and Static, Register variables.	
	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 – structure and pointers –Files: creating, processing, opening and closing a data file.	

Books for Study:	**1.**	Balagurusamy , Programming in C, TMH.
	2.	Kanetkar Y. Let us C, BPB pub, New Delhi, 1999.
Books for Reference:	**1.**	H.schildt, C: The complete reference, 4th Edition, THM Edition, 2000.
	2.	Gottfried, B.S, programming with c, second Edition, THM pub. Co. ltd., New Delhi 1996.
	3.	B.w. Kernighan and D.M.Ritchie, The C programming Language, 2nd Edition, PHI, 1988.

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Title of the Course/ Paper	***PRACTICAL I:- C PROGRAMMING***

Practical	I Year I Semester	Credit: 3
Exercises	**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 2. Reverse a string and check for palindrome 3. Substring detection, count and removal 4. Finding and replacing substrings **III Recursion :** 1. nPr , nCr 2. GCD of two numbers 3. Fibonacci sequence 4. Maximum and Minimum 5. Towers of Honai **IV Matrix Manipulation :** 1.Addition 2.Subtraction 3. Multiplication 4. Transpose of a matrix **V Sorting and Searching :** 1. Insertion Sort 2. Selection Sort 3. Linear Search 4. Binary Search	

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Title of the Course/ Paper	***PAPER-II: - INTERNET PROGRAMMING***		
Core	I **Year** II **Semester**		**Credit: 3**
Course outline	**Unit-1:**	Internet basics, introduction to HTML, list, creating tables, linking documents, frames, graphics to HTML documents, style sheet basics, adding styles to documents.	
	Unit-2:	: Creating style sheet tools, style sheet properties, font, text, list, colour and background colour, box, display properties.	
	Unit-3:	Introduction to JavaScript, Advantages of JavaScript, JavaScript Syntax, data types, variables , arrays. Operators and Expressions, Looping constructors, functions, dialog box, JavaScript, document object model.	
	Unit-4:	Introduction – objects in HTML, event handling, window object, document object, browser object, object methods, built-in objects, user defined objects, cookies.	
	Unit-5:	DHTML, cascading style sheets, class, external style sheets, working with JavaScript style sheet.	

Books for Study:	**1.**	Ivan Bayross – Web Enabled Commercial Application Development, HTML, DHTML, JAVASCRIPT, PERL ,CGI
Books for Reference:	**1.**	Mastering in Javascript – Jaworski, James – BPB pub.

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Title of the Course/ Paper	***PRACTICAL – II - INTERNET PROGRAMMING LAB***	
Practical	I **Year** II **Semester**	**Credit: 3**
Exercises	**I HTML** 1. Create a Web Page for your Personal Information using text formatting tags. 2. Create a web page to display railway train timings. 3. Create a sample web page to promote a product using frames and links. 4. Working with lists **II – JAVASCRIPT:** 1. Create a javascript program to sort the given numbers in ascending and descending order. 2. Factorial of a number 3. Fibonacci series 4. Working with mouse events 5. Manipulation of Strings 6. Create a web page for getting personal details using form controls 7. Write a program to design a calculator **III - Cascading style sheet** 1. Box property in CSS **2.** Font property in CSS	

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Title of the Course/ Paper	***NON MAJOR ELECTIVE: FUNDAMENTALS OF DATABASE CONCEPTS***		
Non Major Elective	I **Year**	I **Semester**	**Credit: 2**
Course outline	**Unit-1:**	SQL Introduction: SQL Language-Role of SQL-SQL Features and Benefits DDL-DML-TCL. SQL Basic: Statements-Names-Data types-Constants-Expressions-Built-in- functions.	
	Unit-2:	Simple Queries: Select-Where-Insert-Update-Delete -SQL Order By-AND- OR-IN-BETWEEN-Aliases-Union-Create-Drop-Alter-Aggregate Functions-Date Functions-Group By-Select into-Create View-Drop View.	
	Unit-3:	Sub Queries: Nested Sub queries-Correlated sub queries-Sub queries in the having clause. Joins: Simple Join-Non Equi join-Inner join-Outer join.	

Books for Study:	**1.**	LEROY, NIRVA MORISSEAV SOLOMON, MARPLAISIR GERALD,P – Oracle 9i SQL programming.

Title of the Course/ Paper	***NON MAJOR ELECTIVE: INTRODUCTION TO ORACLE***		
Non Major Elective	I **Year** II **Semester**		**Credit: 2**
Course outline	**Unit-1:**	SQL Introduction: SQL Language-Role of SQL-SQL Features and Benefits DDL-DML-TCL. SQL Basic: Statements-Names-Data types-Constants-Expressions-Built-in- functions.	
	Unit-2:	Simple Queries: Select-Where-Insert-Update-Delete -SQL Order By-AND- OR-IN-BETWEEN-Aliases-Union-Create-Drop-Alter-Aggregate Functions-Date Functions-Group By-Select into-Create View-Drop View.	
	Unit-3:	Sub Queries: Nested Sub queries-Correlated sub queries-Sub queries in the having clause. Joins: Simple Join-Non Equi join-Inner join-Outer join.	

Books for Study:	**1.**	LEROY, NIRVA MORISSEAV SOLOMON, MARPLAISIR GERALD,P – Oracle 9i SQL programming.

Title of the Course/ Paper	***PAPER- III:- COBOL PROGRAMMING***	
Core	II **Year** III **Semester**	**Credit: 4**
Course outline	**Unit-1:**	Introduction to COBOL – IDENTIFICATION Division – ENVIRONMENT Division – DATA Division –PROCEDURE Division
	Unit-2:	Debugging and Program Testing –Keyboard input and Screen Display- Output Formatting – Arithmetic Operation
	Unit-3:	Report Design and Coding – Conditional Operations – Designing and Writing Control Break Programs
	Unit-4:	Data validation Design and Coding – Processing Arrays/Tables – Processing Multi – Dimensional Tables.
	Unit-5:	Sorting – Master – Transaction File Processing – Index File Processing – Program Management.

Books for Study:	**1.**	Roy, M.K and Ghopsh Dastidar, COBOL Programming , TMGH, New Delhi , 1989.
Books for Reference:	**1.**	Tyler Welburn and Wilson Price – Structed COBOL (Fundamentals and Style) – Fourth Edition – McGraw Hill –1995.
	1.	A.S. Philippakis and L.J.Kazmier-Advanced COBOL-McGraw Hill-1991.

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Title of the Course/ Paper	***PAPER- IV:- OBJECT ORIENTED PROGRAMMING WITH C++***		
Core	II **Year**	III **Semester**	**Credit: 4**
Course outline	**Unit-1:**	Principles of Object Oriented Programming (OOP)-Software evaluation-OOP Paradigm-Basic Concepts of OOP-benefits of OOP-Application of OOP.	
	Unit-2:	Introduction to c++-Tokens-Keywords-Identifiers-Variables-operators-Manipulators-Expresssions and Control Structures-Pointers-Functions-Function Prototyping parameters Passing in Functions-Values return by Functions-Inline functions-Friend and Virtual functions.	
	Unit-3:	Classes and objects-Constructors-Operator overloading-Type Conversions-Type of Constructors-Function Overloading.	
	Unit-4:	Inheritance-Types of Inheritance-Virtual Functions and Polymorphism Constructors in inheritance-Mapping Console I/O operations.	
	Unit-5:	Files-File Operations-File pointer-Error Handling during file operations-Command line arguments.	

Books for Study:	**1.**	E.Balaguruswamy-Object Oriented Programming With C++-TMH.
Books for Reference:	**1.**	Robert Lafore-Object Oriented Programming in Microsoft C++-Galgotia.
	2.	Venugopal – Programming with C

Back

Title of the Course/ Paper	***PAPER- V:- SCIENTIFIC COMPUTATIONAL METHODS***		
Core	II **Year** III **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Roots of Equations: Graphical Method – Bisection Method-False-Position Method - Newton - Rapson method- Secant method – Roots of polynomials: Conventional method- Mullers method. Algebraic equations: Gauss-elimination – Gauss–Jordan-Gauss-seidel.	

	Unit-2:	Numerical differentiation - integration: Trapezoidal Rule- Simpson's rule – Romberg integration – differential equation: Taylor's methods – Euler's method – Runge-kutta second & fourth order method.
	Unit-3:	Diagrammatic and graphical representation of numerical data – Formation of frequency distribution – Histogram, cumulative frequency – polygon and ogive – measures of central tendencies - mean, median, mode – measures of dispersion -mean deviation, standard deviation, variance, quartile deviation and coefficient of variation.
	Unit-4:	Sample space – events – definitions of probability – conditional probability and independence – random variables, distributions – normal – moments and moment generating functions.
	Unit-5:	Correlation and regression analysis: product Moment correlation – coefficient – rank correlation coefficient – simple regression – method of least squares for estimation of regression coefficient. Concept of sampling and sampling distributions –Sampling from Normal distributions – Standard error – Tests of significance – Large sample test for population mean and proportions.

Books for Study:	**1.**	Scientific Computational Methods – Rajaraman
Books for Reference:	**1.**	Snedecor G.W and Cochran W.G (1989): Statistical methods, ed., Affiliated East West.
	2.	Trivedi K.S (1994): probability and statistics with Reliability, Queuing and computer science applications, Prentice Hallof India.

	3.	Balaguruswamy E. (1988): computer oriented statistical and numeric methods , Macmillan India ltd.
	4.	S.C.Chopra and R. P. Canale – numerical methods for engineers – Third Edition – McGraw Hill International Edition –1998.
	5.	S.S Sastri, Introductory Methods of numerical analysis, Prentice Hall

Back

Title of the Course/ Paper	***PRACTICAL III:- COBOL PROGRAMMING***	
Practical	II **Year** III **Semester**	**Credit: 2**

Exercises	1. Square root of a given number. 2. Factorial of a given number. 3. Simple & Compound Interest 4. Sorting given 'N' numbers. 5. Payroll processing 6. Electricity bill processing 7. Department-Name Look-up 8. Sort And Print Earnings File 9. Merging of Files 10. Student grade Inquiry

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Title of the Course/ Paper	***PRACTICAL IV:- C ++ LAB***	
Practical	II **Year** III **Semester**	**Credit: 2**

Exercises	
	Functions 1. Add the specific no. of distance values using inline function
	Classes and Objects 1. Construct a class for storage of dimensions of circle, triangle and rectangle and calculate their areas. 2. Perform arithmetic operation or complex data using class and object.
	Recursion 1. Perform Binary search 2. Print String backwards 3. Factorial of a numbers.
	Polymorphism 1. Overload Unary operator 2. Overload Binary operator 3. Overload operators using friends
	Inheritance 1. Illustrate multilevel inheritance 2. Resolve ambiguity in multiple inheritance (virtual base class)
	Pointers 1. Illustrate the use of THIS operator
	Virtual and Friend Functions 1. Illustrate runtime polymorphism 2. Illustrate working of a friend function
	File Handling in C++ 1. Copy a text file to another 2. Create a file of objects and display the objects stored in the file
	Templates 1. Find largest value contained in an array 2. Illustrate a class template

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Title of the Course/ Paper	***PAPER- VI :- COMPUTER ARCHITECTURE***		
Core	II **Year** IV **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Data representation - Data types - complements, fixed point and floating point representation other binary codes - micro operations: Register transfer language, Register transfer, Bus and Memory transfer, Arithmetic, logic, and shift micro operations, Arithmetic logic shift unit - micro programmed control - control memory - Address sequencing - micro program example - design of control unit.	
	Unit-2:	Central processing unit: General register and stack organizations, instruction formats - Addressing modes, Data transfer and manipulation - program control, RISC - Pipelining - Arithmetic and instruction, RISC pipeline - Vector processing and Array processors.	
	Unit-3:	Computer Arithmetic - Addition and subtraction, Multiplication and division, floating point and decimal Arithmetic operations	
	Unit-4:	Input-output organization - peripheral devices, I/O interface, Asynchronous data transfer, modes of transfer, priority interrupt, direct memory access, I/O processor, serial communications.	
	Unit-5:	Memory organization - Memory hierarchy - main memory - Auxiliary memory - associative, cache and virtual memory, memory management hardware - multi processors: Interconnection structures, Inter processor arbitration.	

Books for Study:	**1.**	Mano, Computer System architecture. PHI (Third Edition) 1993
	2.	P.Naughton and H.Schildt-Java 2(The Complete Reference)-Third Edition TMH 1999.
Books for Reference:	**1.**	V. C. Hamacher, G.Vranesic, S. G.Zaky-Computer Organisation, McGraw Hill.
	2.	J. P.Hayes,. Computer architecture, McGraw Hill, ISE, 1988.
	3.	H. K, Briggs. F.A - Computer Architecture and Parallel Processing, McGraw Hill ISE, 1988

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Title of the Course/ Paper	***PAPER VII - DATABASE MANAGEMENT SYSTEMS***		
Core	II **Year** IV **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Purpose of Database Systems-Overall system structure-Entity relationship Model-Mapping constraints-Primary Keys-foreign Keys-E.R.Diagrams.	
	Unit-2:	Relational Model: Structure-Formal Query Languages-Relational Algebra- Relational Calculus-SQL	
	Unit-3:	Relational Database Design: Pitfalls-Normalization using Functional dependencies- Decomposition- Boyce- Codd Normal form-Third Normal form-Normalization using, multi-valued dependencies-Fourth Normal form.	
	Unit-4:	Object-Based databases Need for Complex Data Types- The Object-Oriented Data Model- Object-Oriented Languages-Persistent Programming Languages. Object - Relational Databases-Nested Relations- Complex Types - Inheritance - Reference Types-Querying with Complex Types – Functions and Procedures- Object-Oriented versus Object-Relational.	
	Unit-5:	Distributed Databases- Introduction-Distributed DBMS Architecture-Storing Data in a Distributed DBMS – Distributed Catalog Management– Distributed Query Processing - Updating Distributed Data–Introduction to Distributed Transaction– Distributed Concurrency Control - Distributed Recovery	

Books for Study:	**1.**	H. F. Korth and A. Silberschatz - Database System concepts - McGraw Hill International Publication -1998.
	2.	Raghu Ramakrsishnan / Johannes Gehrke - Database Management Systems- II Edition , TMH
Books for Reference:	**1.**	DATE, C, J ,Database Systems, PEARSON EDUCATION

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Title of the Course/ Paper	***PAPER VIII -VISUAL PROGRAMMING***		
Core	II **Year** IV **Semester**		**Credit: 4**
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- Select case-nested If then- goto. Built-in Functions-Functions and Procedures.	
	Unit-3:	Lists-Arrays-Filter and Split functions-Sorting and Searching-Records Control Arrays-Combo Boxes- Flex Grid Control-Projects with multiple forms-Do Events and Sub Main-Error Trapping.	
	Unit-4:	VB Objects-Dialog Boxes-Common Controls-Menus-MDI Forms- Testing, Debugging and Optimization.	
	Unit-5:	Monitoring Mouse activity-File system Controls- File System Objects - COM/OLE - automation-DLL Servers-OLE Drag and Drop-Database development using Visual Basic.	

Books for Study:	**1.**	1.Gary Cornell-Visual Basic 6 from the Ground up-Tata McGraw Hill-1999.
Books for Reference:	**1.**	Noel Jerke-Visual Basic 6(The Complete Reference)-Tata McGraw Hill-1999.

Back

Title of the Course/ Paper	***PRACTICAL V - VISUAL BASIC LAB***	
Practical	II **Year** IV **Semester**	**Credit: 2**
Exercises	**Applications** 1. Write a program to convert Roman numerals to decimal. 2. Write a program to do money conversion. (conversion of rupees to various currencies) 3. Write a program to design a calculator with arithmetic, sqrt and trigonometric functions. 4. Write a program to perform temperature conversion and inches to feet conversion. The program should include facility to change font size, to display with precision (decimal places). The program should use MDI forms. 5. Write a program to select items from one list and move them to another list. 6. Write a program to implement the timer and shape controls. 7. Write a program to drag the controls within the form 8. Write a program to implement the slider control 9. Write a program to create a sketchpad using picture box. 10. Write a program to create a range tool using user controls. For the following programs use Oracle, create a database and perform the operations given below. Use a Menu Driven program. Insertion, Deletion, Modification and Generate simple reports using queries. 1. Telephone directory maintenance. 2. Payroll 3. Electricity bill preparation system 4. Invoice System	

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Title of the Course/ Paper	***PAPER IX - PROGRAMMING IN JAVA***		
Core	III **Year** V **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Introduction to Java-Features of Java-Object Oriented Concepts-Lexical Issues- data Types- Variables- Arrays-Operators-control Statements.	
	Unit-2:	Classes –Objects-Constructors-Overloading method-Access Control-Static and fixed methods-Inner Classes-String Class-Inheritance-Overriding methods-Using super Abstract class.	
	Unit-3:	Packages-Access Protection-Importing Packages-Interfaces-Exception Handling Throw and Throws-Thread-Synchronization-Messaging-Runnable Interface-Inter thread Communication-Deadlock- Suspending, Resuming and stopping threads-Multithreading.	
	Unit-4:	I/O Streams-File Streams-Applets-String Objects-String Buffer- Char Array-Java Utilities-Code Documentation.	
	Unit-5:	Working with windows using AWT Classes-AWT Controls-Layout Managers and Menus.	

Books for Study:	**1.**	Cay S.Horstmann, Gary Cornell-core Java 2 Volume I-Fundamentals,5th Edition. PHI,2000.
	2.	P.Naughton and H.Schildt-Java 2(The Complete Reference)-Third Edition TMH 1999.
Books for Reference:	**1.**	Programming with Java, - A Primer – E.Baluguruswamy
	2.	Programming with Java 2 – Xavier, C
	3.	K.Arnold and J.Gosling- The Java Programming Language-Second Edition Addison Wesley, 1996.

Back

Title of the Course/ Paper	***PAPER X - DATA STRUCTURES AND ALGORITHMS***		
Core	III **Year** V **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Definition of Data Structure-Primitive and Composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.	
	Unit-2:	Stacks-Application of Stack-Infix to Postfix Conversion, Recursion, Maze Problems-Queues-Operations on Queues, Queue Application, Circular Queue,	
	Unit-3:	Singly Linked List-Operations, Application-Representation of a Polynomial, Polynomial addition; Doubly Linked List-Operations, Applications-Ordering of Books in Library(Alphabetical Ordering).	
	Unit-4:	Trees and Graphs: Binary Trees-Conversion of Forest to Binary Tree, Operations-Tree Traversals; Graph-Definition, Types of Graphs, Hashing Table and Hashing Functions, Traversal-Shortest Path; Dijkstra's Algorithm.	
	Unit-5:	Algorithm-Definition - Examples-Complexity-Divide and Conquer-Binary Search-Maximum and Minimum-Merge Sort.	

Books for Study:	**1.**	E.Horowitz and S.Shani Fundamentals of Data Structures in C++, Galgotia Pub.1999.
	2.	P.Sudharsan and J.John Manoj Kumar ,C++ & Data Structures, RBA Publications, First Edition
Books for Reference:	**1.**	Horowitz, S.Sahni,and S.Rajasekaran, Computer Algorithms, Galgotia Pub. Pvt. Ltd., 1998.
	2.	R.Kruse C.L. Tondo and B.Leung,Data Structures and Program design in C, PHI, 1997.

Back

Title of the Course/ Paper	***PAPER XI - OPERATING SYSTEMS***		
Core	III **Year** V **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Introduction - System structures-operating system services-user operating system interface-system calls-system programs-Operating system design and implementation--operating –system structure-Virtual Machines–System Boot- Process Management- Process scheduling-operations on processes-Interprocess communication – Communication in client-server systems- Multithreaded programming-overview-multithreading models-thread libraries-Process scheduling-Basic concepts-scheduling criteria-scheduling algorithms-Multiple-Processor scheduling-Algorithm Evaluation	
	Unit-2:	Process Synchronization: Critical-Section Problem-Synchronization Hardware- Semaphores-Classical Problems of Synchronization-Critical Region-Monitors. Deadlocks: Characterization- Methods for Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Recovery.	
	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 Schemes- Implementation-Hardware-Protection-Sharing—Fragmentation- Segmentation	
	Unit-4:	Virtual Memory: Demand Paging-Page Replacement-Page Replacement Algorithms-Thrashing. File System: File Concepts-Access Methods- Directory Structures-Protection Consistency Semantics-File System Structures – Allocation Methods-Free Space Management.	
	Unit-5:	I/O System: 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.	

Books for Study:	**1.**	A.Silberschatz P.B.Galvin,Gange., "Operating System Concepts",7th Edn., John Wiley & Sons., 2002.
Books for Reference:	**1.**	A.Silberschatz P.B.Galvin,Gange., "Operating System Concepts",6th Edn., JohnWiley & Sons., 2002.
	2.	H.M.Deitel,An Introduction to Operating System, Second Edition, Addison esley,1990

Back

Title of the Course/ Paper	***PRACTICAL VII - JAVA PROGRAMMING LAB***	
Practical	III **Year** V **Semester**	**Credit: 2**
Exercises	**Applications** 1. Substring Removal from a String. Use String Buffer class. 2. Finding area and Perimeter of a circle. Use Buffered Reader class 3. Determining the order of numbers generated randomly using Random class. 4. Implementation of Point Class for Image manipulation. 5. String Manipulation using Char Array. 6. Usage of Vector Classes. 7. Implementing Thread based applications & Exception Handling. 8. Application using synchronization such as Thread based, Class based and synchronized statements. **Applets** 1. Working with Frames and various controls. 2. Working with Dialogs and Menus. 3. Working with Panel and Layout. 4. Working with Colors and Fonts.	

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Title of the Course/ Paper	***PRACTICAL VIII - DATA STRUCTURES USING C++***	
Practical	III **Year** V **Semester**	**Credit: 2**
Exercises	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 operatios of a queue using Pointers. 5. Conversion of infix to postfix using stack operations. 6. Postfix Expresssion Evaluation. 7. Addition of two polynomials using Arrays 8. Addition of two polynomials using Pointers. 9. Creation, Insertion,and Deletion in doubly linked list. 10. Binary tree traversals(in-order,pre-order,and post-order) using linked list.	

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Title of the Course/ Paper	***ELECTIVE – I : RESOURCE MANAGEMENT TECHNIQUES***		
Elective - I	III **Year** V **Semester**		**Credit: 5**
Course outline	**Unit-1:**	Basic of Operations Research (OR): Characteristics of O.R-Necessity of O.R in industry-OR and Decision making-Role of computers in O.R. Linear programming: Formulation and Graphical solution (of 2 variables) canonical and standard terms of Linear programming problem.	
	Unit-2:	Algebraic solution: Simplex method- Charnes method of penalties – Two phase simplex method – concept of Duality – properties of duality-Dual simplex method.	
	Unit-3:	Transportation model: Definition-formulation and solution of transportation models – the row- minima, column-minima, matrix minima and vogel's approximation methods. Assignment model: Definition of assignment model-comparison with transportation model-formulation and solution of Assignment model-variation of Assignment problem.	
	Unit-4:	Sequencing problem: Processing each of n jobs through m machines-processing n jobs through 2 machines-processing n jobs through 3 machines – processing 2 jobs through m machines-processing n jobs through m machines – traveling salesman problem. Game Theory: Characteristic of games – maximin,minimax criteria of optimality – Dominance property – algebraic and graphical method of solution of solving 2*2 games.	
	Unit-5:	Pert-CPM: Networks-PERT computation-CPM computation – resource scheduling. Simulation: Various methods of obtaining random numbers for using computer simulation-Additive, multiplicative and mixed types of congruence random number generators-Monte Carlo method of simulation – its advantages and disadvantages.	

Books for Study:	**1.**	Hamdy A.Taha: Operation Research – An Introduction, 5thed. pentprentice Hall of India, Private Limited.,New Delhi,1996.
	2.	Srinath L.S.: PERT and CPM principles and applications, Affiliated East Press Pvt. Ltd., New York, 1973.
Books for Reference:	**1.**	AckoAckoff R.L. and Sasieni M.W.: Fundamentals of Operations Research, John Wiley and sons, NewYork, 1968.
	2.	Charnes A. Copper W. and Hendersen A: Introduction to Linear Programming,Wiley and Sons, New York 1953.

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Title of the Course/ Paper	***ELECTIVE – I : COMPUTER GRAPHICS***		
Elective - I	III Year V Semester		Credit: 5
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 attributes 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 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.	

Books for Study:	**1.**	D. Hearn and M.P. Baker, 2005, Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint.
Books for Reference:	**1.**	S. Harrington,1987, Computer Graphics , 2nd Edition , Tata McGraw-Hill Book Co.
	2.	W.M. Newman and R.F. Sproull ,1997, Principles of Interactive Computer Graphics, 2nd Edition, Tata McGraw-Hill Publishing Co. Ltd.
	3.	D.P. Mukherjee, 1999,Fundamentals of Computer Graphics and Multimedia , 1st Edition, Prentice-Hall of India Pvt. Ltd.

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Title of the Course/ Paper	***ELECTIVE – I E-COMMERCE.***		
Elective - I	III Year V Semester		Credit: 5
Course outline	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.	

Books for Study:	**1.**	Daniel Minoli & Emma Minoli, "Web Commerce Technology Handbook", Tata McGraw Hill – 1999.

Books for Reference:	**1.**	K.Bajaj & D Nag , "E-Commerce", Tata McGraw Hill – 1999.
	2.	Mamta Bhusry – "E-Commerce"

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Title of the Course/ Paper	***PAPER XII - DATA COMMUNICATION AND NETWORKING.***	
Core	III **Year** VI **Semester**	**Credit: 4**
Course outline	**Unit-1:**	Introduction to data communication, network, protocols & 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-499, EIA-530, EIA-202 and x21 interface- interface standards- modems – guided media – unguided media – performance – types of errors- error detection – error correction.
	Unit-3:	Multiplexing – types of multiplexing – multiplexing application – telephone system – project 802 – Ethernet – token bus – token ring – FDDI – IEE 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.

Books for Study:	**1.**	Behrouz and Forouzan – Introduction to Data Communication and Networking – 2nd edition – TMH- 2001.

Books for Reference:	**1.**	Jean Warland – Communication Networks (A first course) – second edition – WCB/McGraw Hill – 1998.
	2.	Behrouz and Forouzan – Introduction to Data Communication and Networking – 3rd edition – TMH- 2001.

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Title of the Course/ Paper	***PAPER XIII -WEB TECHNOLOGY***		
Core	III **Year** VI **Semester**		**Credit: 4**
Course outline	**Unit-1:**	Introduction to HTML Tags – Introduction to XML – XML structure and syntax : Logical structure – XML syntax – Tags – Elements – Comments – Attributes – Cdata – Processing instructions – Entities – Well formed documents .	
	Unit-2:	Validating XML with DTD : Introduction – Defining a DTD – Attribute Declaration – Entity declaration – Combining internal and external DTDs – Other DTD keywords – Client side validation – Server side validation – validating XML with schemas : Components of schemas – Using CSS with XML : XML versus HTML – Cascading style sheet – CSS and XML – Extensible style sheet language : Using XSL style sheet – XSL methods – XSL queries.	
	Unit-3:	ASP.NET Language Structure-Page event, properties & compiler Directives HTML server controls-Anchor, Tables, Forms, Files, Basic Web server controls-Label, textbox, Button, Image, links, check & Radio Button, Hyperlink	
	Unit-4:	Data List Web server controls-Checkbox list, Radio button list, Drop down list, Listbox, Data grid, Repeater. Other Web Server Controls: Calendar Control, AdRotator Control, Validation controls. Request and response objects, cookies.	
	Unit-5:	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	

Books for Study:	**1.**	Professional ASP XML ,Wrox Press Ltd. SPD Pvt. Ltd. ASP.NET Developers Guide, Greg Buczek
Books for Reference:	**1.**	T.A.Powell,complete Reference HTML(Third edition)TMH,2002
	2.	XML Complete Reference,ASP.net Complete Reference, Mc Donald, Mathew, TMH

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Title of the Course/ Paper	***PRACTICAL IX – WEB TECHNOLOGY LAB***	
Practical	III **Year** VI **Semester**	**Credit: 2**
Exercises	***HTML*** • Put an existing image on a web page. Create a table, use a heading and at least one use of rowspan/colspan. Colour a page and some text within the page. Link to another site. • Create a new file called index.html. • Put the normal HTML document structure tags in the file. • Give it a title. • At the bottom of the page (i.e. the last thing between the body tags) put the following; • A horizontal rule. • A link to your email addresses (with your name between the tag); remember to put the link to your email address within address tags. • A line break.	

	XML 1. Creation of XML documents. 2. Validation of XML using DTD 3. Validation of XML using schemas 4. Using CSS in XML 5. Creating XSL style sheets.

Exercises	

ASP.NET

1. Create a web form for online quiz. The score earned by the user should be displayed back.

2. Create a web form for an online library. This form must be able to accept the membership Id of the person borrowing a book, the name and ID of the book, and the name of the book's author. On submitting the form, the user (the person borrowing the book) must be thanked and informed of the date when the books are to be returned. You can enhance the look of the page by using various ASP.NET controls. Use proper validation controls.

3. Create a web form for an online library. This form must be able to accept the membership Id of the person borrowing a book, the name and ID of the book, and the name of the book's author. On submitting the form, the user (the person borrowing the book) must be thanked and informed of the date when the books are to be returned. You can enhance the look of the page by using various ASP.NET controls. Use proper validation controls. Display an advertisement at the bottom of the web from that you created.

4. Create an array containing the titles of five new movies .use this array as a data source for a drop down list control. The page must be capable of displaying the selected movies title to the user when the user clicks on the submit button.

5. Create a web application to generate employee payroll report. The form accepts the employee Id, employee name, basic pay. On submitting the form the allowances and deductions are calculated and display the respective report. Use proper validation controls.

6. Use a calendar control in the page to determine the current date (when the book is borrowed) and calculate the due date, which must be one week from the current date. Display the due date to the user.

7. Create a virtual directory in IIS. Create a global file and include the "session _Start" and "session _End" and, "Application _ Begin Request" and application End request" events. Write a simple ASP.NET page and execute it in the browser.

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Title of the Course/ Paper	***ELECTIVE – II : UNIX AND SHELL PROGRAMMING***		
Core	III **Year** VI **Semester**		**Credit: 5**
Course outline	**Unit-1:**	Salient features of Unix – Unix system organization – types of shells – Unix file systems – Creating files – Listing files and directories – directory related commands – mathematical miscellaneous commands - Unix file system – Boot block – super block – Inode table – Data block – Storage of files - Disk related commands	
	Unit-2:	Essential Unix commands – Password – cal - banner command – touch command – file command – links with Dos - File related commands – wc – sort – cut – grip – dd – viewing files – taking printouts – file compress – online Unix manual - Piping	
	Unit-3:	vi editor - Shell Programming I – Shell variables – Shell keywords – Unchanging variables – wiping out variables – positional parameters – command line arguments – setting values and shift on positional parameters – artithmetic in shell script	
	Unit-4:	Taking decisions – if then – test command – file test – stirng test – nested if – logical operators – else if – case- loops- break - continue	
	Unit-5:	Processes in Unix – background processes – nohup command – killing a process – process priorities – scheduling processes – at command-batch command – crontab command – communication – write command – wall command – mail command	

Books for Study:	**1.**	Unix Shell Programming – Yashwanth Kanetkar BPB publications.
Books for Reference:	**1.**	Unix – The Complete Reference – Kenneth Rosen, Douglas Host, James Farber and Richard Rosinski

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Title of the Course/ Paper	***ELECTIVE – II : ADVANCED JAVA PROGRAMMING***		
Core	III **Year** VI **Semester**		**Credit: 5**
Course outline	**Unit-1:**	Servlet overview – the Java web server – your first servlet – servlet chaining – server side includes- Session management – security – HTML forms – using JDBC in servlets – applet to servlet communication.	
	Unit-2:	The software component assembly model – the Java beans development kit – developing beans – notable beans – using infobus – glasgow developments.	
	Unit-3:	EJB architecture- EJB requirements- design and implementation- EJB session beans- EJB entity beans.	
	Unit-4:	EJB clients- deployment- tips,tricks and traps for building distributed and other systems- implementation and future directions of EJB.	
	Unit-5:	Variable in perl – perl control structures and operators – functions and scope.	

Books for Study:	**1.**	Karl Moss - Java servlets – second edition– Tata McGraw Hill Edition.
	2.	Dustin R.Callaway-Inside Servlets,server side programming for the Java platform- Addison Wesley.
	3.	Joseph O'Neil - Java Beans Programming –TMH.
	4.	PERL: the complete reference 2nd edition – Brown TMH
Books for Reference:	**1.**	Dustin R.Callaway-Inside Servlets,server side programming for the Java platform- Addison Wesley.
	2.	Cay S Horstmann & Gary Cornell – Core Java – Vol II Advanced Features - Addison Wesley Pvt. Ltd. Indian Branch.

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Title of the Course/ Paper	***ELECTIVE – II : RDBMS WITH ORACLE***		
Core	III **Year** VI **Semester**		**Credit: 5**
Course outline	**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 – De normalization – Examples of Normalization.	
	Unit-2:	Oracle9*i*: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - SQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.	
	Unit-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: 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.	

Books for Study:	**1.**	Database Systems Using Oracle – Nilesh Shah, 2nd edition, PHI.
Books for Reference:	**1.**	Database Management Systems – Arun Majumdar & Pritimoy Bhattacharya, 2007, TMH.
	2.	Database Management Systems – Gerald V. Post, 3rd edition, TMH.

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Title of the Course/ Paper	***PRACTICAL- X UNIX AND SHELL PROGRAMMING LAB***	
Practical	III **Year** VI **Semester**	**Credit: 2**

Exercises	1. Write a shell script which receives two file names as arguments. Check whether the file contents are same or not. If same delete the second file. 2. Write shell script, which gets executed the moment the user logs in, it, should display the message GOOD MORNING/GOOD AFTERNOON/GOOD EVENING depending on the time and user logs in. 3. Write a function GO which would change the $ prompt to the current directory name in which you are working. Thus if you are working in \usr\acc the prompt should look like \usr\acc. 4. Write a shell script which displays a) List of all files in the current directory to which you have read, write and execute permissions. b) Receive any number of filenames as arguments and check whether the argument supplied is a file or directory. If it is a directory it should appropriately reported. If it is a filename then name of the file as well as the number of lines present in it should be reported. 5. Write a shell script to search a file from the current directory in any of the sub-directories and report the path. 6. Create a file called TEST which contains sample data as follows. A00001 Shanthi 80,A00007 Arun 70 ,S00005 Karthi 50 . Answer the following questions based on the above. • Display the contents of the file sorted according to the marks in the descending order. • Display the names of the students in the alphabetical order ignoring the cases. • Display the list of students who have scored marks between 60 and 80. • Display the list of students and their register number. 7. Write a shell script to check if the inputs string is a palindrome. 8. Write a shell script to accept two file names and check whether both

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Title of the Course/ Paper	*PRACTICAL- X: ADVANCED JAVA PROGRAMMING LAB*	
Practical	III **Year** VI **Semester**	**Credit: 2**
Exercises	**Beans Programming** 1. Write a quiz applet and use gauge bean to update the score 2. Create a time zone list and retrieve any time which is given with zone using java beans 3. Develop a bean program that display a sequece of images in the form of slide show 4. Create a bean that displays a 3D plot of the following function 5. Z = f(x,y) = 0.01 *(x^2 – y^2) 6. Create a frame that instantiates the beans registers paints to receive color event notifications from selectors adds the beans to the frame and makes the frame visible 7. Create a bean that displays a pie chart and use pie customizer to update the pie chart 8. Develop a bean that takes date and year and represent it in the local language in the form of a calender For (Eg.) French , Italian etc **Servlets Programming** 1. Write a servlet to display 2. IP address and Port no. of server 3. The host name and address of the computer on which your browser visits 4. Use a servlet as RMI client to enable a method given 5. Using servlet create a form which contain a text area, checkbox,	

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Title of the Course/ Paper	*PRACTICAL-X: RDBMS AND ORACLE LAB*	
Practical	III **Year** VI **Semester**	**Credit: 2**
Exercises	**SQL** 1. Simple Queries 2. Set Operations & Aggregate functions 3. DML commands. 4. DDL Commands. 5. Sub Queries 6. Nested Sub Queries 7. Joins and Views. **PL/SQL** 1. PL/SQL Blocks 2. Procedures 3. Functions 4. Cursors 5. Packages 6. Exceptions 7. Triggers 8. Reports	

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Title of the Course/ Paper	***ELECTIVE – III : OBJECT ORIENTED ANALYSIS AND DESIGN***	
Core	III **Year** VI **Semester**	**Credit: 5**
Course outline	**Unit-1:**	System Development-Object Basics-Development Life Cycle-Methodologies-Patterns-Framework-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

Books for Study:	**1.**	Ali Bahrami, "Object Oriented System Development", McGraw-Hill International Edition, 1999.
Books for Reference:	**1.**	1.Booch G., "Object oriented analysis and design", Addison- Wesley Publishing Company, 1994.
	2.	2 Rambaugh J, Blaha.M. Premeriani, W., Eddy F and Loresen W., "Object oriented Modeling and Design", PHI, 1997

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Title of the Course/ Paper	***ELECTIVE – III : SOFTWARE ENGINEERING***		
Core	III **Year** VI **Semester**		**Credit: 5**
Course outline	**Unit-1:**	Introduction to Software Engineering: The Software process: A generic view of process-Software Engineering –Layered technology,Process framework,CMMI ,Process patterns , Process assessment , Personal and Team process models ,Process technology and Product&Process. Process models :Waterfall model,Incremental process models,Evolutionary models,Specialised Process models,Unified process.	
	Unit-2:	Software Engineering: System engineering –computer based systems, System Engineering hierarchy, business process engineering, Product engineering, system modeling. Requirements Engineering- Bridge to design and construction, Requirements Engineering tasks, Initiating the requirements engineering process, Eliciting Requirements , Developing Usecases, Building the analysis model , Negotiating Requirements and Validating Requirements.	
	Unit-3:	Software Engineering: Building the analysis model – Requirement analysis ,Analysis modeling approaches , Data Modeling concepts, Object oriented analysis , Scenario based modeling , Flow oriented modeling ,class based modeling ,Creating Behavioral model. Design Engineering :Design within the context of software Engineering ,Design process and design quality,Design concepts , Design model , Pattern Based Software design	
	Unit-4:	Modeling component level design: What is a component , Defining class based components, conducting component level design ,object constraint language, Designing Conventional components. Performing user interface design: Golden rules, user interface analysis and design , interface analysis ,interface design steps and design evaluation.	
	Unit-5:	Testing strategies: A strategic approach to software testing , strategic issues Test strategy for conventional software, testing strategies for object oriented software, validation testing , system testing and art of debugging. Testing tactics: software testing fundamentals, black box and white testing , White box testing ,Basis path testing , Control structure testing and Black box testing.	

Books for Study:	**1.**	Roger .S. Pressman , Software Engineering – A Practitioner's Approach : McGraw – Hill International Edition , Sixth Edition.
	2.	K.K. Aggarwal & Yogesh Singh, Software Engineering, New Age International publishers.

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Title of the Course/ Paper	***ELECTIVE – III : SOFTWARE TESTING***		
Core	III **Year** VI **Semester**		**Credit: 5**
Course outline	**Unit-1:**	Principles of Testing – Software Development Life Cycle Models.	
	Unit-2:	White Box Testing – Black Box testing – Integration Testing	
	Unit-3:	System and Acceptance Testing – Performance Testing –Regression Testing.	
	Unit-4:	Testing Object – Oriented Systems – Usability and Accessibility Testing Organization structures for Testing Teams.	
	Unit-5:	Test Planning, Management, Execution, and Reporting – Software Test Automation – Test Metrics and Measurements.	

Books for Study:	**1.**	Software Testing Principles and Practices, Srinivasan Desikan

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