

V-Semester B. E. (Computer Technology)

Course Code: CT501

Title of the Course: Advanced Data Structure

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Overview of data structures arrays, stacks, queues, link list , trees, graphs. Sparse matrix Priority queues – definition, ADT, realizing a priority queue using heaps, definition, insertion, deletion, application-heap sort, external sorting- model for external sorting, multiway merge, polyphase merge.	09
II	Dictionaries, linear list representation, skip list representation, operations-insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing extendible hashing, comparison of hashing and skip lists.	09
III	search trees (part i) : binary search trees, definition, adt implementation, operations-searching insertion and deletion, balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations - insertion, deletion and searching.	09
IV	Search trees (part ii) : introduction to red –black trees and splay trees, B-trees-B-tree of order-m, height of a B-tree, insertion, deletion and searching, comparison of search trees. Definitions & operations on weight balanced trees (Huffman trees), 2-3 trees. Augmenting red-black trees to dynamic order statistics and interval tree applications. Operations on disjoint sets and its union-find problem implementing sets. Dictionaries, priority queues and concatenable queues using 2-3 trees.	09
V	Mergeable heaps: Mergeable heap operations, binomial trees implementing binomial heaps and its operations, 2-3-4. Trees and 2-3-4 heaps. Fibonacci heap. Graph theory definitions: definitions of isomorphic components. Circuits, fundamental circuits, cut-sets. Cut-vertices planer and dual graphs, spanning trees, kuratovski's two graphs.	09
Total		45

Text Book/s:

1. A. A. Puntambekar, “ Advance Data Structures”, Technical Publications, 2007
2. Peter Brass, “Advance Data Structures”, Cambridge University Press, 2008

V-Semester B. E. (Computer Technology)

Course Code: CT502

Title of the Course: Design and Analysis of Algorithms

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction: Analyzing and Designing algorithm, Asymptotic notations: Big Oh, Omega, Theta notation, Average, Best and Worst case analysis of algorithms for Time and Space complexity, Amortized Analysis, Solving Recurrence Equations using Substitution method, Recursion-Tree Method and Master method.	09
II	Divide-and-Conquer and Greedy Strategy: Binary Search, Merge and Quick Sort, The maximum-subarray problem, Strassen's algorithm for matrix multiplication. Greedy Method-General Strategy, Knapsack problem, Job sequencing with deadlines problem, minimum cost spanning trees: Prim's algorithm, Kruskal's algorithm, Single source shortest path: Bellman-Ford algorithm, Dijkstra's algorithm, Difference constraints and shortest paths, Huffman Coding etc.	09
III	Dynamic Programming: Basic strategy, all pair shortest path: Shortest paths and matrix multiplication, Floyd-Warshall algorithm, Single source shortest paths, optimal binary search trees, Matrix-chain Multiplication, Elements of dynamic programming, traveling salesman problem.	09
IV	Backtracking and Hash tables: The general method, 8-Queen's problem, Sum of subsets, Graph Coloring, Hamiltonian Cycle, Graph Coloring, Hash tables, Hash functions, Open addressing.	09
V	NP-Hard And NP-Complete Problems: Basic concepts, Non-Deterministic algorithm, The Classes NP-Hard and NP-complete. NP-Complete problems-Satisfiability problem, vertex cover problem. NP-Hard graph problem, scheduling problem, code generation problems, Simplified NP Hard Problems.	09
Total		45

Text Book/s:

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Third Edition, PHI.
2. Ellis Horowitz, Sartaj Sahani, Rajasekaran, "Fundamentals of Computer Algorithms", Second Edition, Universities Press.

References:

1. A. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley
2. Brassard, Bratley, "Fundamentals of Algorithms", PHI

V-Semester B. E. (Computer Technology)

Course Code: CT503

Title of the Course: Java Programming

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	01	--	05	04	03	10	10	80	100

Unit	Contents	Hours
I	A look at procedure oriented programming – Object oriented programming paradigm – Basic concepts of object oriented programming – Benefits of OOP –What is java? - Simple java program- Java vs. C++-Tokens – Keywords – Identifiers and constants –Data types – Type Conversions and Casting - Arrays-Operators - Control statements in java. Class fundamentals –Declaring Objects- Assigning Object Reference Variables – introducing methods- constructors –this keyword- garbage Collection – finalize () method – overloading methods- objects as parameters- returning objects- access control – static- final keyword- Nested classes – Innerclasses- classes with command line arguments	09
II	Basics- Super keyword- Multilevel Hierarchy- Invoking Constructors- Method overriding Abstract Classes – Using Final with Inheritance- Packages- Access Protection – Importing a Packages-Interfaces-Special String Operations – Character Extraction – String Comparison – Modifying a String –String Buffer-String Tokenizer.	09
III	Exception: Types – Uncaught Exceptions – Using Try Catch – Multiple Catch – Nested Try – throw- throws- finally – Built in Exceptions- Using Exceptions– Character Streams- Stream I/O- Serialization. Multithreading: The Java thread model, the main thread, creating a thread, creating multiple threads, synchronization, interthread communication.	09
IV	Applet : Architecture– Skeleton- Simple Applet Display Methods- HTML APPLET tag – Passing Parameters to the Applet- AudioClip and AppletStub Interface. Event Handling: Delegation Event Model – Event Classes –Event listener interfaces-Programs for handling mouse and keyboard events- Using AWT controls-Labels- Text field-Buttons- Check boxes- Choice controls and Scroll bars- Layout Managers and Menus.	09
V	Java Beans: Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API. Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.	09
Total		45

Text Book/s:

1. D.Norton and H. Schildt, “Java 2 -The complete Reference”, Fifth edition, TMH, 2002 (Reprint 2009)

Reference Book/s:

1. By Kathy Sierra, Bert Bates, “Head First Java”, Second Edition, O'Reilly Media,2005
2. M.Deitel and Deitel, “Java- How To Program” 7/e, Prentice Hall Publications.
3. Paul Deitel , Harvey M Deitel, Java for Programmers, Pearson, 2010.
4. Elliote Rusty Harold, “Java Network Programming” Third Edition, O’Reilly Publishers.
5. “Java Cook Book”, Second Edition O’Reilly Media 2002.

V-Semester B. E. (Computer Technology)

Course Code: CT504

Title of the Course: System Programming

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Background Machine Structure, Assemblers, Loaders, Macros, Compilers, Formal System, Operating system User Viewpoint : Functions, Operating System User Viewpoint: Batch Control Language, Operating System User Viewpoint: Facilities.	09
II	Machine Structure, Machine Language, And Assembly Language General Machine Structure, General Approach to a New Machine,	10
III	Assemblers General Design Procedure, Design of Assembler. Macro Language and the Macro processor Macro instructions, features of Macro Facility, Macro Instruction Arguments, Conditional Macro Expansion, Macro Calls within Macros, Macros Instructions Defining Macros, Implementation, Implementation of a restricted Facility A Two pass Algorithm, A Single pass Algorithm, Implementation of Macro Calls within Macros, Implementation within an Assembler.	9
IV	Loaders Loader schemes, "Compile and go" Loaders, general Loader scheme, absolute loaders, subroutine linkages, relocating loaders, direct linking loaders, other loader schemes-Binders, linking loaders; Overlays, Dynamic Binders, Design of and absolute Loaders, Design of a Direct-Linking loaders	09
V	Introduction to Device Drivers. Device drivers for Windows, Linux/Unix. Lexical Analysis in Compiler Design. Role of lexical analysis, recognition of tokens.	08
Total		45

Text Books:

1. System Programming by John J. Donovan, Mc Graw Hill
2. System Programming by Leland Beck, Pearson Ed.
3. Assembly & Assemblers by Gorshine, Prentice Hall.

Reference Book/s:

1. Unix device drives by George Pajani, Pearson Ed.
2. Device Drives for Windows by Norton, Add Wesley

V-Semester B. E. (Computer Technology)

Course Code: CT505

Title of the Course: Design Principles of Programming Languages

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Languages Design Issues: Why Study Programming Languages, Role of Programming Languages, Programming Environment, Impact of Machine Architectures: Operations of a Computer, Virtual Computers and binding times. Language Translation Issues: Programming Language Syntax, Stages in translation	10
II	Elementary Data types: Properties of Types & objects, Scalar data types, Composite Data types.	08
III	Encapsulation: Structured data types, Abstract data types, Encapsulation by subprograms, Type definition. Inheritance, Polymorphism.	09
IV	Sequence Control: Implicit and Explicit Sequence Control, Sequencing with arithmetic expressions, Sequence control between statements, sequencing with non-arithmetic statements, Subprogram Control: Subprogram Sequence Control, Attributes of data control, parameters transmission.	09
V	Storage Management: Elements requiring storage, programs & system controlled storage, static storage management, Distributed Processing :- Variations in subprogram control, Parallel programming.	09
Total		45

Text Book/s:

1. Programming Languages: Design and Implementation by Terrance W. Pratt, Marvin V. Zelkowitz & T.V. Gopal (Pearson Education)
2. Programming Languages: Paradigm and Practice by Doris Appleby & Julius J. VandeKopple (Tata McGraw-Hill Edition)

V-Semester B. E. (Computer Technology)

Course Code: CT506

Title of the Course: Advanced Data Structure

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	03	02	25	25	50

List of Practicals
Practical no .1 &2 should be based on Abstract data type
Practical no .3 should be based on priority queue
Practical no .4 should be based on dictionary
Practical no .5 &6 should be based on binary search tree and AVL tree
Practical no .7 should be based on Search trees ,red black tree ,B-tree
Practical no .8 should be based on Huffman tree
Practical no .9 &10 should be based on mergeable heaps

V-Semester B. E. (Computer Technology)

Course Code: CT507

Title of the Course: Design and Analysis of Algorithms

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	03	02	25	25	50

Practicals
Practical No. 1 & 2 should be based on Unit No.1
Practical No.3 & 4 should be based on Unit No. 2
Practical No. 5 & 6 should be based on Unit No. 3
Practical No. 7 & 8 should be based on Unit No. 4
Practical No. 9 & 10 should be based on Unit No. 5

V-Semester B. E. (Computer Technology)

Course Code: CT508

Title of the Course: Java Programming

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	03	02	25	25	50

List of Practicals
Students are expected to perform 10 practicals from the given list
<ol style="list-style-type: none">1. Programs illustrating overloading and overriding method in JAVA.(Use any application)2. Programs illustrating the implementation of various forms of inheritance (Ex. Single, Hierarchical, Multilevel inheritance etc..).3. Programs which illustrates the implementation of multiple inheritance using interfaces in JAVA.4. Programs which illustrates the Implementation of Inheritance by Method overriding, Super constructor and super keyword, abstract class (Use any application)5. Programs which illustrate the manipulation of strings:1) Sorting an array of strings in ascending order. 2) Frequency count of words and characters in a text file. Etc.,6. Programs for sorting and searching a list of elements.7. Programs for addition and multiplication of matrices.8. Programs to create packages in JAVA.9. Programs to create multiple threads in JAVA.10. Programs to write applets to draw the various shapes: a) Cylinder b) Cube c) Square inside a circle d) Circle inside a square e) Polygons etc.,11. Create and manipulate labels, lists, text fields, text areas and panels.12. Understand and handle mouse events and keyboard events.13. Client/Server interaction with stream socket connections (Use NET packages).14. Exception Handling for – (a) Divide by zero error (b) Null values (c) Data entry15. Program to read the data from user and save it to two different files, display the contents and exchange the contents of those two files using IO package.16. Develop an animation program using Multithreading viz. Bouncing Ball.17. Program to scroll the banner using applet.18. Design 8-digit calculator using AWT package and layout managers.19. Implementation of Client / Server mechanism using Socket classes.20. Design Database program for Employee details and implement INSERT, SELECT, DELETE, UPDATE queries using JDBC21. Design concurrent server that will handle multiple clients using multithreading.

V-Semester B. E. (Computer Technology)

Course Code: CT509

Title of the Course: Programming-II

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	03	02	25	25	50

Practicals
1 st , 2 nd and 3 rd practical should be on program development using netbeans, eclipse and Jcreator
4 th practical should be on GUI designing using dreamweaver.
5 th and 6 th practical should be on developing java server pages.
7 th practical should be on use of apache tomcat server.
8 th and 9 th practical should be on introduction to android application development