Course (Category) Code	Course Name	Teaching Scheme (Hrs/week)					Credits Assigned			
		L	T	P	O	E	L	T	P	Total
OE	Data Structures and Algorithms	2	0	2	5	9	2	0	1	3
		Examination Scheme								
		Component	ISE		MSE		ESE			Total
OECS3		Theory	50		50		100			200
		Laboratory	50		-----		50			100

Pre-requisite Course Codes, if any.	1. Problem-solving using imperative programming
Course Objective:	
Course Outcomes (CO): ***At the End of the course students will be able to***	
OECS3.1	Apply various operations of linear and non-linear data structures to given problems.
OECS3.2	Apply the concepts of Trees and Graphs to a given problem.
OECS3.3	Analyze the algorithm for given Problem statement
OECS3.4	Apply the Divide and Conquer, Greedy method, Dynamic Programming strategy to solve given problems.

CO-PO Correlation Matrix (3-Strong, 2-Moderate, 1-Weak Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
OECS3.1	1	2	2					2				2
OECS3.2	1	2	2					2				2
OECS3.3	1	2	2					2				2
OECS3.4	1	2	2					2				2

CO-PEO/PSO Correlation Matrix (3-Strong, 2-Moderate, 1-Weak Correlation)

	PEO1	PEO2	PEO3	PEO4	PSO1	PSO2	PSO3

	EXTC	ETRX	EXTC	ETRX	EXTC	ETRX	EXTC	ETRX	EXTC	ETRX	EXTC	ETRX	EXTC	ETRX
OECS3.1	**1**	**1**			**1**	**1**					**1**	**1**		
OECS3.2	**1**	**1**			**1**	**1**					**1**	**1**		
OECS3.3	**1**	**1**			**1**	**1**					**1**	**1**		
OECS3.4	**1**	**1**			**1**	**1**					**1**	**1**		

BLOOM'S Levels Targeted (Pl. Tick appropriate)

Remember	Understand	Apply	Analyze ✓	Evaluate	Create

Theory Component

Module No.	Unit No.	Topics	Ref.	Hrs.
1	**Title**	**Introduction to Data Structures**		**8**
	1.1	Concept of Linear and Non-linear Data Structures **Stack:** Stack as ADT, operations on the stack, **Queue:** Queue as ADT, Operations on Queue,	1,2	4
	1.2	**Linked List:** Linked List as ADT, Operations on Singly Linked List. Types of the linked list- Linear and circular linked lists, Doubly Linked List	1,2	4
2	**Title**	**Trees**		**4**
	2.1	Trees as ADT, General tree v/s Binary Tree Terminology, Traversal of Binary Tree, Operations on Binary tree, Binary Search Tree and its operations	1,2	4
3	**Title**	**Graphs**		**3**
	3.1	Graph as ADT, Introduction To Graph, Representation of Graph-Adjacency Matrix, Adjacency List, Graph Traversal Technique	1,2	3
4		**Introduction to Analysis of algorithm**		**7**
	4.1	Role of Algorithms in Computing, Performance analysis-space and time complexity, Growth of Functions: Asymptotic Notation, Analysis of sorting algorithms Such as Selection sort and insertion sort.	1,2	**3**
	4.2	**Divide and Conquer Approach –** General Method, Analysis of Merge Sort, Analysis of Quick sort, Analysis of Binary search, Master Method	1,2	**4**
5		**Greedy and Dynamic Programming Approach**		**6**
	5.1	**Greedy Approach:** Basic strategy, Knapsack problem, single-source shortest path-Dijkstra's algorithm. Minimum cost spanning trees-Kruskal algorithm	1,2	**3**

	5.2	**Dynamic Programming:** Assembly-line scheduling, Longest common subsequence	1,2	**3**
6	**Self Study topic**	**Hashing** Introduction to Hash Table, Hash functions, Collision Resolution Technique **Backtracking and Branch-and-bound:** General Method 8 queen problem (N-queen problem) Sum of subsets. Traveling Salesman proble		**5**
			Total	**28**

Laboratory Component, if any (Minimum 10 Laboratory experiments are expected)

Sr. No.	Title of the Experiment
1	Implement a given problem statement using Stack.
2	Implement a given problem statement using Queue
3	Implement a given problem statement using Linked List.
4	Implement a given problem statement using Doubly Linked List.
5	Implement a given problem statement using Binary Trees.
6	Apply Graph Traversal Technique on a given problem statement to solve the problem
7	Implement and analyze insertion sort selection sort
8	Implement and analyze problem based on Divide and Conquer strategy - Merge and Quick sort
9	Implement a given problem statement using Greedy Strategy.
10	Implement a given problem statement using Dynamic Programming.

Text Books

Sr. No.	Title	Edition	Authors	Publisher	Year
1	Introduction to Algorithms	Third Edition	Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein	MIT Press	2009
2	Fundamentals of Computer Algorithms	Second Edition	Horowitz E, Sahni S and S.Rajasekaran	Galgotia Publications	2010

Reference Books

Sr. No.	Title	Edition	Authors	Publisher	Year
1	Classic Data Structures	Second	Samanta Debasis	PHI	2009
2	Data Structures With C	First	Seymour Lipschutz	Schaum's Outline Series	2010