LECTURE PLAN

Institute/Department	UNIVERSITY INSTITUTE OF ENGINEERING (UIE)	**Program**	**Bachelor of Engineering - Computer Science & Engineering (CS201)**
Master Subject Coordinator Name:	Priyanka Sharma	**Master Subject Coordinator E-Code**:	**E6197**
Course Name	Design And Analysis Of Algorithms Lab	**Course Code**	**20CSP-312**

Lecture	Tutorial	Practical	Self Study	Credit	Subject Type
0	0	2	0	1.0	P

Course Type	Course Category	Mode of Assessment	Mode of Delivery
Program Core	Graded (GR)	Practical Examination (PRAC)	Practical (PRAC)

Mission of the Department	MD1: To provide practical knowledge using state-of-the-art technological support for the experiential learning of our students. MD2: To provide an industry-recommended curriculum and transparent assessment for quality learning experiences. MD3: To create global linkages for interdisciplinary collaborative learning and research. MD4: To nurture an advanced learning platform for research and innovation for students' profound future growth. MD5: To inculcate leadership qualities and strong ethical values through value-based education.
Vision of the Department	"To be recognized as a leading Computer Science and Engineering department through effective teaching practices and excellence in research and innovation for creating competent professionals with ethics, values, and entrepreneurial attitude to deliver service to society and to meet the current industry standards at the global level."

Program Educational Objectives(PEOs)	
PEO1	PEO1 Graduates of the Computer Science and Engineering will contribute to the Nation's growth through their ability to solve diverse and complex computer science and engineering problems across a broad range of application areas. (PEO1 is focused on Problem Solving)
PEO2	PEO2 Graduates of the Computer Science and Engineering will be successful professionals, designing and implementing Products & Services of global standards in the field of Computer Science & Engineering, becoming entrepreneurs, Pursuing higher studies & research. (PEO 2 is focused on Professional Success)
PEO3	PEO3 Graduates of the Computer Science and Engineering Program will be able to adapt to changing scenario of dynamic technology with an ability to solve larger societal problems using logical and flexible approach in decision making. (PEO 3 is focused on Attaining Flexibility and Adaptability)

Program Specific OutComes(PSOs)	
PSO1	PSO1 Exhibit attitude for continuous learning and deliver efficient solutions for emerging challenges in the computation domain.
PSO2	PSO2 Apply standard software engineering principles to develop viable solutions for Information Technology Enabled Services (ITES).

Program OutComes(POs)	
PO1	PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	PO2 Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	PO3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal, and environmental considerations.
PO4	PO4 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO5	PO5 Modern tool usage: Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	PO6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7	PO7 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	PO9 Individual or teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	PO10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	PO11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	PO12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context to technological change.

Text Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Introduction to Algorithms	Cormen, Leiserson, Rivest, Stein	3rd edition 2012	Prentice Hall of India	2012
2	Fundamentals of ComputerAlgorithms	2. Horowitz, Sahni and Rajasekaran	2nd edition	University Press (India)	NA

Reference Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Data Structures using C and C++	Tanenbaum, Augenstein, &Langsam	NA	Prentice Hall of India	NA
2	Fundamentals of Algorithm	Brassard, Bratley	NA	Prentice Hall of India	NA
3	The Art of Computer Programming, Volume 1: Fundamental Algorithms	Knuth	Volume 1, Third Edition	NA	NA
4	Data Structures, Schaum's Outline Series	Lipschutz, S	NA	Tata McGraw Hill	NA
5	Data Structures & Program Design	Kruse	NA	Prentice Hall of India	NA
6	The Design and analysis of Computer Algorithms	Aho, Haperoft and Ullman	NA	", Pearson Education India.	NA

Course OutCome

SrNo	OutCome
CO1	Apply the knowledge of algorithm design techniques to solve the problems of searching, sorting and graph algorithms.
CO2	Design the algorithm using advanced techniques for solving complex problems with Real life Examples
CO3	Develop the solution of a real time problem using various tools like flowchart, algorithms, programs, etc.
CO4	Utilize the modern engineering tools for algorithm techniques to implementation algorithms for complex engineering problems like divide and conquer, greedy approach, etc.
CO5	Develop algorithms to solve real-time problems like finding shortest path and will able to see function on multi-disciplinary teams through mini projects based on various problems.

Lecture Plan Preview-Practical

Unit No	ExperimentNo	Experiment Name	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Numer(s)
1	1	Compute GCD of 2 numbers	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO1
1	2	Implement power function in nlogn complexity	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO2
1	3	Find frequency of elements in a given array o(n)	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO3
1	4	Implementation doubly and stacks	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4
2	5	find an optimal solution to matrix chain multiplic	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4
2	6	implement subset-sum problem using Dynamic Program	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4
2	7	implement 0-1 Knapsack using Dynamic Programming	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4
3	8	Code and analyze to do a DFS	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4

3	9	find shortest paths : Dijkstra's algorithm	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO5
3	10	find all occurrences of pattern P in given string	,T-Fundamentals of ComputerAlgori,T-Introduction to Algorithms,R-Data Structures & Program Desi,R-Data Structures using C and C+,R-Data Structures, Schaum's Outl,R-Fundamentals of Algorithm,R-The Art of Computer Programmin,R-The Design and analysis of Com	Hand On Activity based	CO4

Assessment Model			
Sr No	Assessment Name	Exam Name	Max Marks
1	20PRAC01	External Viva / Voce	40
2	20PRAC01	Experiment-1	30
3	20PRAC01	Experiment-2	30
4	20PRAC01	Experiment-3	30
5	20PRAC01	Experiment-4	30
6	20PRAC01	Experiment-5	30
7	20PRAC01	Experiment-6	30
8	20PRAC01	Experiment-7	30
9	20PRAC01	Experiment-8	30
10	20PRAC01	Experiment-9	30
11	20PRAC01	Experiment-10	30
12	20PRAC01	Mid-Term Test	20

CO vs PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO2	NA	NA	3	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO3	NA	2	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO4	NA	2	3	3	NA	NA	NA	NA	NA	NA	NA	NA	3	2
CO5	NA	2	3	3	NA	3	NA	NA	NA	NA	3	3	2	3
Target	3	2.25	3	3	NA	3	NA	NA	NA	NA	3	3	2.5	2.5