

Course Code CSE3004	Design and Analysis of Algorithms	Course Type LT	Credits 4
Pre-requisite knowledge is required on data structures and algorithms.			
Course Objectives:			
<ul style="list-style-type: none"> To provide the knowledge about the methods of advanced algorithms To understand the advanced algorithms such as Geometric Algorithm and Parallel Algorithm 			
Course Outcomes:			
<p>Students will be able to solve problems, explore real-world software development challenges, and create practical and contemporary applications. At the completion of this course, students should be able to do the following:</p> <ul style="list-style-type: none"> Apply the algorithm design techniques to analyze, solve and evaluate computing problems. Apply algorithmic principles in modeling and designing software systems 			
Student Outcomes (SO): b, c, i, k, l			
<p>b. An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.</p> <p>c. An ability to design, implement and evaluate a system / computer-based system, process, component or program to meet desired needs</p> <p>i. Design and conduct experiment as well as analyze and interpret data.</p> <p>k. An ability to use current techniques, skills and tools necessary for computing engineering practice.</p> <p>l. An ability to apply mathematical foundations, algorithmic principles and computer science theory in the modeling and design of computer-based systems (CS)</p>			
Unit No	Unit Content	No. of hours	SOs
1	NP-completeness: The complexity classes P and NP: Definition of the classes P and NP; NP completeness	09	b,c,i
2	Advanced algorithmic analysis: Amortized analysis; Dynamic programming – Matrix Chain Multiplication; combinatorial optimization, Elements of greedy strategies, activity, Huffman code.	10	c,i
3	String matching algorithms: Naïve string matching algorithms, KMP algorithm, Rabin-Karp algorithm, suffix trees, Exact string matching algorithm using suffix trees.	09	c,i
4	Geometric algorithms: Line segments: properties, intersections; convex hull finding algorithms.	08	c,i
5	Approximation algorithms: Limitations of approximation, basic techniques, Vertex-cover problem, traveling salesman problem, set-cover problem	07	c,i,k
6	Guest Lecture on Contemporary Topics	02	
	Total Hours:	45	
Mode of Teaching and Learning: <i>Flipped Class Room, Activity Based Teaching/Learning, Digital/Computer based models, wherever possible to augment lecture for practice/tutorial and minimum 2 hours lectures by industry experts on contemporary topics</i>			

Mode of Evaluation and assessment:

The assessment and evaluation components may consist of unannounced open book examinations, quizzes, student's portfolio generation and assessment, and any other innovative assessment practices followed by faculty, in addition to the Continuous Assessment Tests and Final Examinations.

Text Books:

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| 1. | Thomas H. Cormen , Charles E. Leiserson , Ronald L. Rivest , Clifford Stein, Introduction to Algorithms, 3rd Edition, MIT Press, 2009 |
| 2. | Ellis Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms, S. P. Publications, 2nd edition, 2007 |

Reference Books:

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| 1. | G. Brassard and P. Bratley - Fundamentals of Algorithmics - PHI - 2001. |
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Recommendation by the Board of Studies on	<i>June 25, 2018</i>
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Approval by Academic council on	<i>July 18, 2018</i>
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Compiled by	<i>Dr S Raju and Dr R Ganesan</i>
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