



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

## COURSE CONTENT

ADVANCED ALGORITHMS LABORATORY								
II Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2525872	Professional Core courses	L	T	P	C	CIA	SEE	Total
		0	0	4	2	40	60	100
Contact Classes: 0	Tutorial Classes: 0	Practical Classes: 60			Total Classes: 60			
requisites: Strong foundation in Data Structures								

### Course Overview:

The student can able to attain knowledge in advanced algorithms

### Course Objectives:

1. To understand advanced algorithm design techniques and performance analysis methods.
2. To develop problem-solving skills using brute-force, divide-and-conquer, and greedy strategies.
3. To implement algorithms for matrix operations, graph problems, and optimization techniques.
4. To apply string matching and pattern searching algorithms in real-world applications.
5. To evaluate algorithm efficiency and complexity for solving computational and network flow problems.

### Course Outcomes: After Completion of the Course, Students should be able to

1. Apply brute-force and divide-and-conquer approaches to solve computational problems such as assignment tasks and large integer multiplication in scientific computing.
2. Analyze optimization strategies including greedy methods and Gaussian elimination to design efficient solutions for knapsack and system-of-equation problems in engineering applications.
3. Evaluate matrix factorization techniques like LU decomposition and transitive closure algorithms such as Warshall's for performance in real-time data processing.
4. Differentiate among string-matching algorithms including Rabin-Karp, KMP, and Horspool to identify the most suitable method for text mining and bioinformatics applications.
5. Create network flow-based solutions by implementing maximum flow algorithms to optimize logistics, communication, and resource allocation problems.

### LIST OF EXPERIMENTS

1. Implement assignment problem using Brute Force method
2. Perform multiplication of long integers using divide and conquer method.
3. Implement a solution for the knapsack problem using the Greedy method.
4. Implement Gaussian elimination method.
5. Implement LU decomposition
6. Implement Warshall algorithm
7. Implement the Rabin Karp algorithm.
8. Implement the KMP algorithm.
9. Implement Harspool algorithm
10. Implement max-flow problem

### TEXT BOOKS:

1. Design and Analysis of Algorithms, S.Sridhar, OXFORD University Press

### REFERENCE BOOKS:

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education

### ELECTRONIC RESOURCES:

1. <https://nptel.ac.in/courses/106/101/106101060/>
2. <https://www.geeksforgeeks.org/fundamentals-of-algorithms/>
3. <https://www.coursera.org/specializations/algorithms>
4. <https://www.codechef.com/>

### MATERIALS ONLINE:

1. Course template
  2. Open-ended experiments
  3. 3.Definitions and terminology
  4. Lab Manual
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