Course Name	DESIGN AND ANALYSIS OF ALGORITHM	Course Code	COMP 322		
Credit Hours	3	Contact Hours	Lec	Lab	Total
			2	2	4
Offered as	☐ University Requirement ☐ College Requirement ☒ Program Requirement ☒ Core ☐ Elective ☐ ITEC ☒ COMP ☐ CNET				
Level	6	Prerequisite	COMP 321		

Course Description:

This course provides the students techniques for designing and analyzing algorithms such as brute-force and divide-and-conquer. The course covers the basic design techniques and algorithms that addresses important set of well-defined problems: DFS and BFS; shortest-path algorithms (Dijkstra's and Floyd's algorithms); transitive closure (Floyd's algorithm); minimum spanning tree (Prim's and Kruskal's algorithms); topological sort. Different algorithms for a given computational task are presented and their relative merits evaluated based on performance measures In addition, the course will provide different complexity characteristics P and NP classes, NP-completeness and reduction techniques.

Upon completion, the student will be able to:

- Prove the correctness and analyze the running time of the basic algorithms.
- Apply the algorithms and design techniques to solve problems.
- Analyze the complexities of various problems in different domains.
- Design and analyze different design strategies of algorithms like divide-and-conquer, decrease-and-conquer, transform-and-conquer and compare performance of various algorithms.
- Implement shortest path algorithms (Dijkastra's and Floyd's), minimum spanning tree algorithm (Prim's and Kruskal's) and transitive closure using Warshall's algorithm and their performance.
- Discover the limitation of algorithm power as P, NP and NP-complete problem.

Assessment Methods							
	Exam-1 ☒	10%	Exam-2 ☒	10%	Assignments ☒	20%
	Attendance ☐	-	Lab Exam ☒	20%	Final Exam ☒	40%

Text Book:

- Anany Levitin, " Introduction to the Design and Analysis of Algorithm" , Pearson/Addison-Wesley, 3rd Edition, , ISBN-10: 0132316811, 2011

References:

- Thomas H. Cormen, Charles E Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", MIT Press, Cambridge, ISBN 978-0-262-03384-8, 2009.
- Alfred V. Aho, John E. Hopcroft, "The Design and Analysis of Computer Algorithms", Addison- Wesley Longman Publishing Co., 1st Edition, ISBN: 0201000296, 1974.