Course Name	Analysis and Design of Algorithms	Course Code	COMP	323
Credit Hours	3	Contact Hours	Lec: 2	Lab: 2 / Total: 4
Track	☐ University Requirement ☐ College Requirement ☒ Required ☐ Elective ☒ COMP ☐ INFS ☐ CNET			
Level	7th Level	Prerequisite	Algorithm and datastructure-2 (COMP-222)	

Course Description:

This course provides to the students a techniques for designing and analyzing algorithms such as brute-force,divide-and-conquer,decrease-and-conquer,Space and Time Trade Off(Boyer Moore Algorithm and Horspool Algorithm); They acquire some understanding on design techniques and algorithms that address an 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. In addition, the course will provide different complexity characteristics P and NP classes, NP-completeness and reduction techniques.

Course Objectives:

After successful completion of the course students will be able to:

Describe the notion of algorithms, fundamental of algorithm solving and data structures.

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.

Effectively **apply** computer programming languages, programming paradigms and design patterns.

Discover the limitation of algorithm power as P, NP and NP-complete problem.

Know the advanced and modern topics, and mathematical and scientific principles relevant to computer Science

Grading						
	☒ Assignment(s)	20 %	☒ Exam-1	10 %	☒ Exam-2	10 %
	☐ Mini Project		☒ Lab Exam / Case Study	20 %	☒ Final	40 %

Text Books:

Introduction to the *Design and Analysis of Algorithm* by Anany Levitin, October'9, 2011, 3rd Edition, Pearson/Addison-Wesley, ISBN-10: 0132316811

References:

1. *Introduction to Algorithms*, Thomas H. Cormen, Charles E Leiserson, and Ronald Rivest, 2009, MIT Press, Cambridge.
2. *The Design and Analysis of Computer Algorithms*, Aho, Hopcroft & Ullman, 2003, Pearson Education

*** University Required:** Introduction to Computer, Islamic Culture I – IV, Arabic Language

*** College Required:** Courses that are common and mandatory in all three programs