

Analysis of Algorithms					
Credit Hours:	3	Course Code:	COSC-3115	Prerequisites:	Data Structures
Course Learning Outcomes (CLOs):					
At the end of the course the students will be able to:				Domain	BT Level
1. Explain what is meant by “best”, “expected”, and “worst” case behavior of an algorithm				C1 (Describe)	2
2. List and contrast standard complexity classes				C1 (Describe)	
3. Solve problems using graph algorithms, including singlesource and all-pairs shortest paths, and at least one minimum spanning tree algorithm				C4 (Apply)	3
* BT= Bloom’s Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain					
#	SDG	Relevant CLOs			
1	SDG 4: Quality Education	CLO 1: Solve problems using graph algorithms, including singlesource and all-pairs shortest paths, and at least one minimum spanning tree algorithm			
Course Content:					
Introduction; role of algorithms in computing, Analysis on nature of input and size of input Asymptotic notations; Big-O, Big Ω, Big Θ, little-o, little-ω, Sorting Algorithm analysis, loop invariants, Recursion and recurrence relations; Algorithm Design Techniques, Brute Force Approach, Divide-and-conquer approach; Merge, Quick Sort, Greedy approach; Dynamic programming; Elements of Dynamic Programming, Search trees; Heaps; Hashing; Graph algorithms, shortest paths, sparse graphs, String matching; Introduction to complexity classes.					
Teaching Methodology:					
Lectures, Written Assignments, Practical labs, Semester Project, Presentations					
Course Assessment:					
Sessional Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam					
Reference Material:					
1 Introduction to Algorithms (3rd edition) by Thomas H. Corman, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein					
2. Algorithm Design, (1st edition, 2013/2014), Jon Kleinberg, Eva Tardos,					
3. Algorithms, (4th edition, 2011), Robert Sedgewick, Kevin Wayne					