

COURSE OUTLINE

Course Code: CSE 208

Course Title: Data Structures and Algorithms II Sessional

Level/Term: L2T2 Section: A, B

Academic Session: July 2021

Course Teacher(s):

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Course Outline:

Graph algorithms; MST algorithms, Shortest path algorithms, Maximum flow and maximum bipartite matching; Lower bound theory; Advanced data structures: Balanced binary search trees (AVL trees, red-black trees, splay trees etc.), Advanced heaps (Fibonacci heaps, binomial heaps); Hashing; NP-completeness; NP-hard and NP complete problems; Coping with hardness: Backtracking, branch and bound, Approximation algorithms;

Learning Outcomes/Objectives:

After undergoing this course, students should be able to:

- understand and analyze performance of algorithms in terms of time and space,
- formulate various algorithmic problems and design efficient algorithms to solve those problems,
- solve real world problems using algorithms,
- utilize advanced data structures for efficient implementations of algorithms,
- understand various complexity classes of algorithmic problems , and
- design backtracking, branch and bound and efficient approximation algorithms to cope with hard combinatorial problems.





Assessment (tentative):

Offline + Viva : 30% - 50%

Online + Viva : 20% - 40%

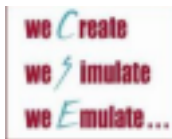
Quiz : 20% - 40%

Text and Reference Books:

- Algorithm Design, by Michael T. Goodrich and Roberto Tamassia, John Wiley & Sons, Inc.
- Algorithms, by Sanjoy Dasgupta, Christos Papadimitriou and Umesh Vazirani.
- Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press.
- Algorithm Design, by Jon Kleinberg and Eva Tardos, Pearsons Publishers.
- Introduction to the Design & Analysis of Algorithms, by Anany Levitin.
- Algorithm Design Manual, by Steven S. Skiena.

Tentative Weekly schedule:

Week	Topics
Week 1	
Week 2	Introduction - Basic Graph Algorithms (Practice-No grading)
Week 3	Sessional Class - Graph Algorithms - Online, Viva
Week 4	Minimum Spanning Tree (Offline, Online, Viva)
Week 5	Single Source Shortest Path Problem(Offline, Online, Viva)
Week 6	All-Pair Shortest Path Problem (Offline, Online, Viva)
BREAK	
Week 7	Maximum Flow and Maximum Bipartite Matching (Offline, Online, Viva)
Week 8	Advanced Data Structure-I (Offline, Viva) - Heaps
Week 9	Advanced Data Structure-II (Offline, Viva) - AVL/Red Black Tree
Week 10	Hashing (Offline, Online, Viva)
Week 11	NP & NP-Completeness (Online, Viva)
Week 12	Approximation Algorithms, Branch and Bound (Offline, Online, Viva)
Week 13	Quiz



*** Please DO NOT COPY solutions from anywhere (your friends, seniors, internet etc.). Any form of plagiarism (irrespective of source or destination), will result in getting -100% marks in the online/offline.**

Prepared by:	
Signature: Sadia Sharmin	
Date:23/11/2021	