

COURSE OUTLINE

Course Code: CSE 208

Course Title: Data Structures and Algorithms II Sessional

Level/Term: L2T2 Section: A, B

Academic Session: January 2020

Course Teacher(s):

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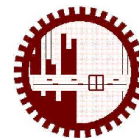
Course Outline:

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; String matching algorithms; FFT and its applications.

Learning Outcomes/Objectives:

After undergoing this course, students should be able to:

- understand and analyze performance of algorithms in terms of time and space, and prove the correctness of algorithms,
- 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:	30-40%
Online:	30-40%
Quiz:	30-40%

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.

Weekly schedule:

Week	Topics	Teacher's Initial
Week 1	Introduction	All
Week 2	Basic Graph Algorithms (Offline and Online)	All
Week 3	Single Source Shortest Path Problem (Offline and Online)	All
Week 4	All-Pair Shortest Path Problem (Offline and Online)	All
Week 5	Minimum Spanning Tree (Offline and Online)	All
Week 6	Maximum Flow and Maximum Bipartite Matching (Offline and Online)	All
Week 7	Reserved	All
Week 8	Advanced Data Structure-I (Offline and Online)	All
Week 9	Advanced Data Structure-II (Offline and Online)	All
Week 10	Hashing (Offline and Online)	All
Week 11	NP & NP-Completeness (Practice)	All
Week 12	Approximation Algorithms, Branch and Bound (Offline and Online)	All
Week 13	Reserved	All
Week 14	Quiz	All

*** 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:	
Date:	