Department of Computer Science and Engineering, BUET

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):

| Name:	Office/Room:	E-mail
Dr. Muhammad Masroor Ali	ECE 219	mmasroorali@cse.buet.ac.bd
Dr. Md. Shamsuzzoha Bayzid	ECE 521	shams_bayzid@cse.buet.ac.bd
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Md. Toufikuzzaman	ECE 209	toufikuzzaman@teacher.cse.buet.ac.bd

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:

i. understand and analyze performance of algorithms in terms of time and space,

ii. formulate various algorithmic problems and design efficient algorithms to solve those problems,

iii. solve real world problems using algorithms,

iv. utilize advanced data structures for efficient implementations of algorithms,

v. understand various complexity classes of algorithmic problems , and

vi. design backtracking, branch and bound and efficient approximation algorithms to cope with hard combinatorial problems.

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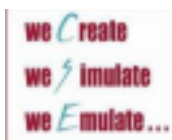
Assessment (tentative):

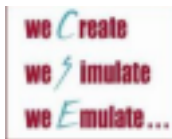   Offline + Viva : 30% - 50%

    Online + Viva : 20% - 40%

    Quiz : 20% - 40%

Text and Reference Books:

    a. Algorithm Design, by Michael T. Goodrich and Roberto Tamassia, John Wiley & Sons, Inc.

    b. Algorithms, by Sanjoy Dasgupta, Christos Papadimitriou and Umesh Vazirani.

    c. Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press.

    d. Algorithm Design, by Jon Kleinberg and Eva Tardos, Pearsons Publishers.

    e. Introduction to the Design & Analysis of Algorithms, by Anany Levitin.

    f. 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

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