

COURSE OUTLINE

Course Code: CSE 204

Course Title: Data Structures and Algorithms I Sessional

Level/Term: 2/1

Section: A+B

Academic Session: January 2021

Course Teacher(s):

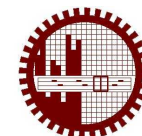
Name	Initial	Office/Room	E-mail and Telephone(optional)
Dr. Md. Abul Kashem Mia	MAKM	ECE 315	kashem@cse.buet.ac.bd
Dr. Mohammed Eunus Ali	MEA	ECE 317	eunus@cse.buet.ac.bd
Dr. Mahmuda Naznin	MN	ECE 318	mahmudanaznin@cse.buet.ac.bd
Dr. Md. Monirul Islam	MDMI	ECE 211	mmislam@cse.buet.ac.bd
Shadman Saqib Eusuf	SSE	ECE 415	ssaqib@cse.buet.ac.bd
Preetom Saha Arko	PSA	ECE 508	arko@cse.buet.ac.bd
Md. Tareq Mahmood	TM	ECE 510	tareq.mhmd71@gmail.com
Shehab Sarar Ahmed	SSA	ECE 516	shehab@teacher.cse.buet.ac.bd
Md. Masum Mushfiq	MMM	ECE 418	masummushfiq@cse.buet.ac.bd

Course Outline:

Internal data representation; Abstract data types; Introduction to algorithms; Asymptotic analysis: growth of functions, O , Ω and Θ notations; Correctness proof and techniques for analysis of algorithms; Master Theorem; Elementary data structures: arrays, linked lists, stacks, queues, trees and tree traversals, graphs and graph representations, heaps, binary search trees; Graph Traversals: DFS, BFS, Applications of DFS and BFS; Sorting: heap sort, merge sort, quick sort; Data structures for set operations; Methods for the design of efficient algorithms: divide and conquer, greedy methods, dynamic programming.

Objectives:

- Demonstrate a familiarity with major data structures.
- Analyze the asymptotic performance of different algorithms.
- Apply important algorithmic design paradigms and methods of analysis.
- Assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- Choose the appropriate data structure and algorithm design method for a solving different real-life problems



Learning Outcomes:

After undergoing this course, students should be able to

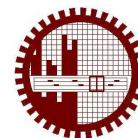
- i. understand algorithmic behavior in terms of time and space
- ii. understand average case, worst case, best case behavior of algorithms
- iii. design, analyze, and implement basic data structures such as arrays, lists, stacks, queues, trees, and graphs
- iv. design, analyze, and implement some advanced data structures such as heaps
- v. assess data structure impacts on the performance of an application
- vi. compare between several data structures and choose the best one for specific application
- vii. learn basic graph algorithms and their applications
- viii. learn sorting algorithms
- ix. formulate problems and solve them using greedy method, divide and conquer, dynamic programming

Assessment:

Homework Assignments with Viva:	50-60%
Online Assignments:	20-30%
Quiz :	20-30%

Text and Reference Books:

- a. Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press, 3rd Edition
- b. Data Structures and Algorithms in Java, 6th Edition
Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser
- c. Algorithm Design, by Jon Kleinberg and Eva Tardos, Pearsons Publishers
- d. Data Structures and Algorithm Analysis, Edition 3.2 (C++ Version) by Clifford A. Shaffer
- e. Data Structures and Algorithms in C++, 2nd Edition by Michael T., Roberto Tamassia and David M. Mount
- f. Algorithms, by Sanjoy Dasgupta, Christos Papadimitriou and Umesh Vazirani



Weekly schedule:

Week	Topics	Teacher's Initial
Week 1	Introduction	
Week 2	Assignment on ArrayList	
Week 3	Evaluation on ArrayList	Eunus
Week 4	Evaluation on LinkedList	Saqib
Week 5	Evaluation on Stack/Queue	Mahmuda
Week 6	Evaluation on Tree/Binary Search Tree	Arko
Week 7	Evaluation on Heaps	Shehab
Week 8	Evaluation on Graphs and Graph Traversals	Mushfiq
Week 9	Reserved	
Week 10	Evaluation on Sorting Algorithms	Monir
Week 11	Evaluation on Divide and Conquer	Tareq Mahmood
Week 12	Evaluation on Greedy Algorithms	Mr. C
Week 13	Evaluation on Dynamic Programming	Kashem
Week 14	Reserved	
Week 15	Quiz	

Prepared by :	
Name:	
Signature:	
Date:	