



**East West University**  
**Department of Computer Science and Engineering**  
**Course Outline**  
**Spring 2021 Semester**

**Course: CSE207 Data Structures**

**Credits and Teaching Scheme**

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	3 Hours/Week for 13 Weeks + Final Exam in the 14 <sup>th</sup> Week	2 Hours/Week for 13 Weeks	5 Hours/Week for 13 Weeks + Final Exam in the 14 <sup>th</sup> Week

**Prerequisite**

CSE110 Object Oriented Programming

**Instructor Information**

**Instructor:** Dr. Maheen Islam, Associate Professor, CSE Dept.  
**Office:** Room # 628  
**Tel. No.:** 09666775577 (hunting) extn. 258  
**E-mail:** maheen@ewubd.edu  
**TA:** TBA

**Class Routine and Office Hour**

Days	8:30 – 10:00	10:10-11:40	11:50-1:20	1:30-3:00	3:10-4:40	4:50 – 6:20
<b>Sunday</b>	CSE207(1)	CSE207(2)	<i>Office Hour</i>			
<b>Monday</b>	CSE 405(4)	<i>Office Hour</i>				
<b>Tuesday</b>	CSE207(1)	CSE207(2)	<i>Office Hour</i>	CSE 207(1) LAB		
<b>Wednesday</b>	CSE 405(4)	<i>Office Hour</i>				
<b>Thursday</b>	CSE 405(4) LAB	CSE 207(2) LAB	<i>Office Hour</i>	<i>Office Hour</i>		

## Course Objective

The course develops students' skills for designing and analyzing linear and non-linear data structures. It strengthens students' ability to identify and apply the suitable data structure for solving real world problems. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE246 Algorithms, CSE366 Artificial Intelligence, CSE405 Computer Networks, and CSE 471 Compiler Design.

## Knowledge Profile

K3: Theory-based engineering fundamentals

## Learning Domains

Cognitive - C2: Understanding, C3: Applying, C4: Analyzing

Psychomotor - P2: Manipulation, P3: Precision

Affective - A2: Responding

## Program Outcomes (POs)

PO1: Engineering Knowledge

PO2: Problem Analysis

## Complex Engineering Problem Solution

EP1: Depth of knowledge required

EP2: Range of conflicting requirements

## Course Outcomes (COs) with Mappings

After completion of this course students will be able to:

CO	CO Description	PO	Learning Domains	Knowledge Profile	Complex Engineering Problem Solving/ Engineering Activities
CO1	<b>Interpret</b> and <b>Apply</b> linear lists for effective data representation.	PO1	C2, C3	K3	EP1
CO2	<b>Interpret</b> and <b>Apply</b> non-linear lists for representing hierarchical and connected data.	PO1	C2, C3	K3	EP1

CO3	<b>Choose</b> and <b>justify</b> appropriate data structure for solving computational problems.	PO2	C3, C4	K3	EP2
CO4	<b>Use</b> and <b>Analyze</b> the appropriate data structure for solving problems <b>Perform</b> and <b>Demonstrate</b> skills, and <b>Write</b> report to design, build and test complex problems.	PO2	C3, C4, A2, P2, P3	K3	EP1, EP2

#### Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels			CO Mark	Exam (Mark)
			C2	C3	C4		
Data Types, Pointer, Structure, Dynamic Memory Allocation and Abstract Data Types (ADTs) List ADT : Singly and doubly Linked list Implementation and Basic operations with Application	Lecture, Class Discussion, Discussion Outside Class with Instructor/ Teaching Assistant	CO1	2	3		5	Midterm Exam I (20)

Stack and Queue ADT : Basic operations and Implementation	Do	CO1		10		10	
Stack and Queue ADT : Applications		CO3		3	2	5	
Iterative Solution and Recursive Solution design	Do	CO2		6		6	Midterm Exam II (20)
Basic Tree Concepts, Tree Traversals, Binary Trees		CO2	3	3		6	
Binary Search Trees ADT and applications		CO3		2	2	4	
Balanced BST		CO3			4	4	
Binary Heap implementation, application, Priority queue	Do	CO2		7		7	Final Exam (20)
Graph representation, Terminology, Graph creation, traversal techniques,		CO2		6		6	
Spanning Tree, MST, Shortest Path Problem		CO3			4	4	
Hashing: Hash table generation, Collision resolution		CO3		3		3	

### Laboratory Experiments and Assessment Scheme

Experiment	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels	Mark of Psycho-motor Learning Levels		Mark of Affective Learning Levels	Mark of COs
			C4	P2	P3	A2	
Implement program using pointers, structure and DMA etc.	Preparing Pre-Lab Report, Lab Experiment and Result Analysis, Preparing Post-Lab Report	CO4					
Implementation of different operations on linked list – copy, concatenate, split, reverse, count no. of nodes etc.	Do	CO4					
Implementations of stack menu driven program.	Do	CO4					
Implementations of queue menu driven program.	Do	CO4					
Implementations of recursion.		CO4					
Implementations of BST program.	Do	CO4					
Implementations of Binary heap program.	Do	CO4					

Implementations of graph and graph menu driven program (BFS & DFS).	Do	CO4					
Lab Experiments			7	1	1	1	10
Lab Exam	Individual Lab Exam	CO4	4	1			5
<b>Total</b>			<b>11</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>15</b>

### Mini Projects

Mini Project	Teaching-Learning Method	CO	Mark of Cognitive Learning Level	Mark of Psychomotor Learning Levels		Mark of Affective Learning Level	CO Mark
			C4	P2	P3	A2	
Mini Project including Report and Presentation	Group-based, moderately complex electrical circuit building for practical application with report writing and presentation	CO4	7	1	1	1	10

## Assessment Scheme

Assessment Area	CO				Other	PO Marks	
	CO1	CO2	CO3	CO4		PO1	PO2
Class Participation					5		
Class Test/Quiz					10		
Midterm-I Exam	15	0	5	0		15	5
Midterm-II Exam	0	12	8	0		12	8
Final Exam	0	13	7	0		13	7
Laboratory Performance and Lab Exam	0	0	0	15			15
Mini Project	0	0	0	10			10
<b>Total</b>	<b>15</b>	<b>25</b>	<b>20</b>	<b>25</b>	<b>15</b>	<b>40</b>	<b>45</b>

## Teaching Materials/Equipment

### Textbook

- Gilberg, Richard, and Behrouz Forouzan. Data Structures: A pseudocode approach with C, 2<sup>nd</sup> Edition, Publisher:Nelson Education, 2004.

### References

- Aho, Alfred V., and Jeffrey D. Ullman. Data structures and algorithms. Publisher: Pearson, 1983
- Cormen, Thomas H., Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Introduction to algorithms. Publisher:MIT press, 2009

### Lab Manual:

Lab manual will be provided.

### Project Description:

Project description will be provided.

### Equipment/Software:

Any C/C++ IDE: As example, Visual C++, Code::Block, and/or Dev-C++

## Exam Dates

Section	Term I	Term II	Final
1 & 2	21.03.2021	18.04.2021	30.05.2021

## Grading System

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
97-100	A+	4.00	73-76	C+	2.30
90-96	A	4.00	70-72	C	2.00
87-89	A-	3.70	67-69	C-	1.70
83-86	B+	3.30	63-66	D+	1.30
80-82	B	3.00	60-62	D	1.00
77-79	B-	2.70	Below 60	F	0.00

## Academic Code of Conduct

### Academic Integrity:

Any form of cheating, plagiarism, personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

### Special Instructions:

- Students are expected to attend all classes and examinations. A student **MUST** have at least 80% class attendance to sit for the final exam.
- Students will not be allowed to enter into the classroom after 20 minutes of the starting time.
- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student misses any exam, the student **MUST** get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48 hours** of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application.
- For **final exam**, there will be NO makeup exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss the final exam, the student **MUST** get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours** of the final exam time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor.**
- All mobile phones **MUST** be turned to silent mode during class and exam period.
- There is **zero tolerance for cheating** in exam. Students caught with cheat sheets in their possession, whether used or not; writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinee, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university.**