UNITED INTERNATIONAL UNIVERSITY

Department of Computer Science and Engineering (CSE)

Course Syllabus

Part A: Introduction		
1	**Course Title**	Data Structure and Algorithms – I Laboratory
2	**Course Code**	CSE 2216
3	**Pre-requisites**	CSE 1112, CSE 1116
4	**Course Type**	Core Course
5	**Credit Hours**	1.00
6	**Contact Hours**	2.5 Hours/Week
7	**Semester**	4th
8	**Total Marks**	100
9	**Course Instructor's Information**	Samin Sharaf Somik Email: samin@cse.uiu.ac.bd Room: 418-B
10	**Course Rationale**	This course has been designed to provide a solid foundation about the data structure and algorithms used in computer science. This course will give insights about the pros and cons of different data structures and algorithms.
11	**Course Objectives**	The objectives of this course are: • To familiarize the basic data structures (array, linked list). • To familiarize complex data structures (queue, stack, priority queue) using basic data structures • To use suitable data structures for different algorithms • To introduce the algorithms and their complexity and use cases
Part B: Content of the Course		
12	**Course Contents (approved by UGC)**	Sorting Algorithms: Bubble Sort, Insertion Sort, Selection Sort, Linked List: Single Linked List, Double Linked List, Stack: Implementation using Array and Linked List, Queue: Implementation using Array and Linked List, Binary Search Tree: Construction, Operations (Insertion, Deletion, etc.), Graph: Introduction, Implementation using Adjacency Matrix and Adjacency List, BFS, DFS. Tree Traversal(Preorder, Postorder, Inorder)
13	**Course Outcomes (COs)**	

COs	**Description**
CO1	**Implement** appropriate data structure to handle large datasets efficiently as applied to specified problem definition.
CO2	**Able** to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
CO3	**Able** to use linear and non-linear data structures like stacks, queues, linked list etc.

14 Mapping of COs and Program outcomes

COs	Program Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			C									
CO2			C									
CO3				C								

15 Mapping COs with Teaching-Learning and Assessment Strategy

Class	Topics/Assignments	Course Outcomes (COs)	Lab Outcomes/ Activities
1	Introduction Sorting Algorithms : Bubble Sort	CO1	Lecture
2	Sorting Algorithms: Selection Sort, Insertion Sort	CO1	Lecture
3	**Coding Test 1: Sorting** Searching: Linear. Binary	CO1, CO2	Coding Test, Lecture
4	**Coding Test 2: Searching** Singly Linked List: Intro + Insertion + Deletion + Search	CO2, CO3	Coding Test, Lecture
5	Doubly Linked List, Circular Linked List, *Declaration of Home Assignment 1: Linked List*	CO2, CO3	Lecture
6	**Mid-Term Exam**	CO1,CO2, CO3	Graded Exam
7	Stack using Array and Linked List, **Home Assignment 1: Linked List Evaluation**	CO2, CO3	Lecture, Home Assignment
8	Queue using Array and Linked List, *Declaration of Home Assignment 2: Stack Queue*	CO2, CO3	Lecture
9	Graph Representation, **Home Assignment 2: Stack Queue Evaluation**	CO1,CO2, CO3	Lecture, Home Assignment
10	**Coding Test 3: Graph Representation** BFS, DFS, *Declaration of Home Assignment 3: BFS DFS*	CO2, CO3	Coding Test, Lecture
11	Tree Traversal(Preorder, Postorder, Inorder), BST, **Home Assignment 3: BFS DFS**	CO1,CO2, CO3	Lecture, Home Assignment

	Evaluation		
12	**Final Exam**	CO1, CO2, CO3	Graded Exam

Part C: Assessment and Evaluation Methods

Assessment Types	Marks
Attendance	10%
Home Assignments	25%
Coding Tests	30%
Mid Exam	15%
Final Exam	20%

Grading System

Letter Grade	Marks %	Grade Point	Letter Grade	Marks%	Grade Point
A (Plain)	90-100	4.00	C+ (Plus)	70-73	2.33
A- (Minus)	86-89	3.67	C (Plain)	66-69	2.00
B+ (Plus)	82-85	3.33	C- (Minus)	62-65	1.67
B (Plain)	78-81	3.00	D+ (Plus)	58-61	1.33
B- (Minus)	74-77	2.67	D (Plain)	55-57	1.00
			F (Fail)	<55	0.00

Part D: Learning Resources

Text Book	1. Introduction to Algorithms – Thomas H. Cormen (4th edition, MIT Press & McGraw Hill, 2022) 2. Data Structure and Algorithms in C++ - Goodrich, Tamassia (2nd edition, John Wiley and Sons Inc., 2003)
Reference	1. http://www.geeksforgeeks.org (for implementation)
LMS URL	http://lms.uiu.ac.bd/course/view.php?id=2459

Appendix-1: Program outcomes

POs	Program Outcomes
PO1	An ability to apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Identify, formulate, research and analyze complex engineering problems and reach substantiated conclusions using the principles of mathematics, the natural sciences and the engineering sciences.
PO3	An ability to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety and of cultural, societal and environmental concerns.
PO4	An ability to conduct investigations of complex problems, considering experimental design, data analysis and interpretation and information synthesis to provide valid conclusions.
PO5	An ability to create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of their limitations
PO6	An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PO8	An ability to apply ethical principles and commit to the professional ethics, responsibilities and the norms of the engineering practice.
PO9	An ability to function effectively as an individual and as a member or leader of diverse teams and in multidisciplinary settings.
PO10	An ability to communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.
PO11	An ability to demonstrate knowledge and understanding of engineering and management principles and apply these to one's work as a team member or a leader to manage projects in multidisciplinary environments.
PO12	An ability to recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.