University of Asia Pacific (UAP)

Department of Computer Science and Engineering (CSE)

Course Outline

Program:	Computer Science and Engineering (CSE)
Course Title:	Data Structures and Algorithms Lab I
Course Code:	CSE 204
Semester:	Fall 2024
Level:	2nd Year 1st Semester
Credit Hour:	1.50
Name & Designation of Teacher:	Nayeema Sultana, Lecturer
Office/Room:	7th Floor
Class Hours:	Monday 8.00 AM-10.40 AM (C1)
Consultation Hours:	TBA
E-mail:	nayeema@uap-bd.edu
Mobile:	+8801723209558
Pre-requisite (if any)**:**	CSE 103, CSE 104, CSE 108
Course Synopsis:	Introduction to data structures and their purposes, along with operations and complexity, representation of multidimensional datasets, and various types of data operations like insertion, deletion, sorting, searching, compression, etc.

Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:

CO No.	CO Statements: Upon successful completion of the course, the students should be able to:	Corresponding PO (Appendix - 1)	Bloom's taxonomy domain/level (Appendix -2)	Delivery Methods and Activities	Assessment tools
CO1	**Classify** a problem into its supporting data structures and algorithms.	1	1/Understand	Lecture, multimedia	Quiz, Written exam
CO2	**Solve** practical problems by applying the algorithm techniques and appropriate data structures.	3	1/Apply	Lecture, Problem Solving	Quiz, Written exam
CO3	**Analyze** problems using different algorithmic paradigms and **choose** the best one for solving a problem	4	1/Analyze	Lecture, Problem Solving	Quiz, Written exam

Weighting COs with Assessment Methods:

Assessment Type	% weight	CO1	CO2	CO3
Online tasks (assignments/ contests)	20%		10	10
Final Exam	30%	4	19	7
Viva	10%	5		5
Class performance	40%	5	30	5
Total	100%	14	59	27

Course Content Outline and mapping with COs

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
1-2	Orientation to Data Structures Lab. Tasks on Array: 1) Static & Dynamic Array 2) Traversing 3) Delete 4) Insert 5) Update 6) Reverse 7) Merge 8) Divide	CO1, CO2	Lecture, multimedia	Slides

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
3	**Sort:** Bubble Sort, Insertion Sort, Selection Sort implementation.	CO1, CO2	Lecture, multimedia	Slides
4	**Search:** Perform search operation using Linear Search, Binary Search, and interpolation search	CO1, CO2, CO3	Lecture, multimedia	Slides
5	**Stack:** Design a Stack using an array and perform the following operations: 1) PUSH, 2) POP, 3) PEEK, 4) isFull & 5) isEmpty	CO1, CO2	Lecture, multimedia	Slides
6	**Queue:** Design a Queue using an array and perform the following operations: 1) ENQUEUE, 2) DEQUEUE, 3) PEEK, 4) isFull, 5) isEmpty, 6) Circular queue	CO1, CO2	Lecture, multimedia	Slides
7	**Recursion:** Constructing a problem using both iterative and recursive approaches and comparing them	CO2, CO3	Lecture, multimedia	Lab sheets
8	**Viva of online tasks up to mid** **Pointer and Structure:** Basics of pointers. Creating a linked list and traversing the list.	CO1	Lecture, multimedia	Slides
9-10	**Singly linked list:** Create a Singly Linked List & perform the following operations: 1) insert data into the list at a specific position, 2) update data of a specific node, 3) delete a node, 4) according to input print the linked list in each time in the above operations.	CO1, CO2	Lecture, multimedia	Slides
11	**Doubly and circular linked list:** Create a Doubly Linked List & perform the following operations: 1) insert data to the list at a specific position, 2) update data of a specific node, 3) delete a node 4) according to input Print the linked list in each time in the above operations.	CO1, CO2	Lecture, multimedia	Slides
12	**Graph:** Taking input of a graph using adjacency matrix and adjacency list.	CO1, CO2	Lecture, multimedia	Slides
13	**Final Exam & Viva**			

Textbook: Data Structures with C, SEYMOUR LIPSCHUTZ, Special Indian Edition, Thirteenth reprint 2015, McGraw-Hill Education

Recommended References: **Computer Fundamentals:** www.tutorialspoint.com

Grading System: As per the approved grading scale of the University of Asia Pacific (Appendix-3).

Special Instructions: Late attendance: Students who will enter the class after the start of the call will be marked as absent.

Assignment: **Unfinished** work should be submitted as an assignment. **Additional** assignments may be given as needed. Copied homework will be graded as zero. Late submission will result in a 50% deduction in the score.

Students' responsibilities: Students must come to class prepared for the course material covered in the previous class. They must submit their assignments on time.

Prepared by (Course Teacher)	Checked by (Chairman, PSAC committee)	Approved by (Head of the Department)
Sultana		

Washington Accord Program Outcomes (PO) for engineering programs:
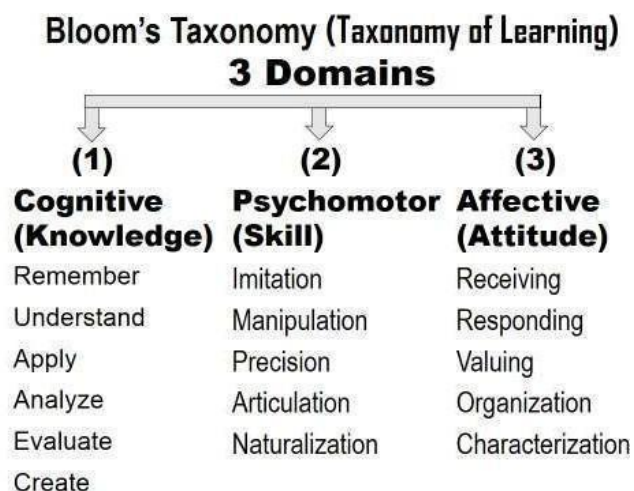
No.	PO	Differentiating Characteristic
1	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
2	Problem Analysis	Complexity of analysis
3	Design/ development of solutions	Breadth and uniqueness of engineering problems i.e., the extent to which problems are original and to which solutions have previously been identified or codified
4	Investigation	Breadth and depth of investigation and experimentation
5	Modern Tool Usage	Level of understanding of the appropriateness of the tool
6	The Engineer and Society	Level of knowledge and responsibility
7	Environment and Sustainability	Type of solutions.
8	Ethics	Understanding and the level of practice
9	Individual and Team work	Role in and diversity of the team
10	Communication	Level of communication according to the type of activities performed
11	Project Management and Finance	Level of management required for differing types of activity
12	Lifelong learning	Preparation for and depth of continuing learning.

Generic Skills (Detailed):
1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals, and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature, and analyze complex engineering problems, and reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economic, ethical, environmental, and sustainability issues.
4. **Investigation (D)** Conduct investigation into complex problems, displaying creativity, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, and contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;

8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of the professional engineering code of practice.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one's work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities for entrepreneurship.

Appendix-2

Bloom's Taxonomy (Taxonomy of Learning)
3 Domains

(1) Cognitive (Knowledge)	(2) Psychomotor (Skill)	(3) Affective (Attitude)
Remember	Imitation	Receiving
Understand	Manipulation	Responding
Apply	Precision	Valuing
Analyze	Articulation	Organization
Evaluate	Naturalization	Characterization
Create		

Appendix-3
UAP Grading Policy:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00