Al-Al Bayt University
Prince Hussein bin Abdullah Faculty of Information Technology
Computer Science

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Course Syllabus

Course Title	**Data Structures**	Course Code	901240
Coordinator	Suhair Bani ata	**Prerequisite(s)**	**901210**
E-mail	Suhair_bani@aabu.edu.jo	**Credit Hours**	3
Course Is	√ **Required**	☐ **Elective**	

Course Description:

Introduce the students to data structures using an object-oriented programming language. This includes logical and physical representation of data structures, collection types, array-based lists, linked lists, stacks, queues, binary trees, binary search trees, hashing, searching, sorting and recursion. Applications and algorithms based on data structures are covered in this course

Course Learning Outcomes (CLO):

Introduce the students to data structures using an object-oriented programming language. This includes:Learn how to create a class (Class Definition; Accessing Data Members and Member Functions. Constructors and Destructors. this include:

1. logical and physical representation of data structures.
2. collection types.
3. array-based lists, linked lists.
4. stacks, queues.
5. binary trees, binary search trees.
6. hashing, searching, sorting, and recursion.

Tentative Topics Covered	
Week No	**Topic**
1	Ch1. Programming Preview. • What is Data Structure? • What are Algorithms? • To revise the use of pointers in relation to arrays • To revise the use of classes with pointers • To revise the use of dynamics arrays

2+3	Ch2. Stack • Learn about stacks • Examine various stack operations • Learn how to implement a stack as an array • Learn how to implement a stack as a linked list • Become aware of the STL class stack • Discover stack applications
4+5	Ch3. Queue • Learn about queues • Examine various queue operations • Learn how to implement a queue as an array • Learn how to implement a queue as a linked list • Examine the STL class queue • Discover queue applications • Learn about priority queue • Examine the STL class priority_queue
6	• **First Exam**
6+7	Ch4. Recursion • Basic Recursion • Towers of Hanoi • Recursive Vector Operations • Recursive Linked lists operations
8	Ch5. List part 1 • What is Abstract Data Type (ADT)? • What is Containers? • What is List? • How to implement a simple Linked List?
9+10	Ch6. List part 2 • Implement linked list using pointers • Concept of iterators • STL's list class • Other variations of linked list
11+12	Ch7. Searching +Hashing • Concept of searching • Different types of searching algorithms • Concept of comparison trees • Concepts of hashing & hashing techniques
13	• **Second Exam**
13+14+15	Ch8. Sorting Ch9. Binary Search Tree. • Different types of sorting techniques • Tree • Binary Tree • Binary Search Tree • General Tree
16	• **Final exam**

Textbook(s)

Title	Data Abstraction and Solving with C++		
Author(s)	Frank Carrano, D.J. Henry	**Publisher**	Walls and Mirrors
Edition	6th edition	**Year**	**2012**

References

Book Titles (Author(s), Title, Edition, Publisher, Year)	Website URL (if available)
Recent references available at Al al-Bayt University library (book name, author, edition, year, copies available) 1. Data Structures using C++ , D. S. Malik, Course Technology, 2nd edition , 2009. 2. **3.** Data Structures and program design in C++, Robert L.Kruse and Alexander J.Ryba, Prentice-Hall, International edition, 1999.	

Evaluation

Assessment Tool	Marks
- First Exam*	20
- Second Exam*	20
- Assignments (Reports, Quiz, Seminar, Tutorial, etc.) **- Discipline, presence and participation**	-
- Lab**	10
- Final Examination	50