Faculty of Computers and Information Technology

Data Structures

Information :

Course Code :	CS222	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Faculty of Computers and Information Technology

Instructor Information :

Title	Name	Office hours
Professor	Khaled Tawfic Hassan Wassif	6
Teaching Assistant	IBRAHIM AYMAN IBRAHIM AHMED TAGEN	

Area Of Study :

Define and use standard data structures classes.
Design program with different data structures: array, linked list, stacks, queues, trees, graph and hash tables.
Compare alternative implementations of data structures with respect to the performance.
Compare and contrast the costs and benefits of dynamic and static data structure implementations.
Choose the appropriate data structures for modeling a given problem.

Description :

Built-in data structures. Stacks, queues, linked lists, tree structures. Sorting algorithms, searching algorithms, hashing and graphs.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Outline the standard data structures.
2 -	Explain the concepts of different data structures (array, linked list, stacks, queues, trees, and graph and hash tables)
3 -	State the different data structure algorithms.
4 -	Identify the suitable data structure for a given problem
b.Intellectual Skills: :	
1 -	Analyze a given problem to design a system using a suitable data Structure.
2 -	Select appropriate data structure for a given problem solution and setting out their limitations, restrictions and errors.
3 -	Differentiate between data structures algorithms and techniques.
c.Professional and Practical Skills: :	
1 -	Design, Implement and test a data structure to solve various problems.
2 -	Apply data structure concepts for implementing a computer based system.
3 -	Create complete user programs using different data structures
4 -	Use the built-in libraries of any data structure.

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d.General and Transferable Skills: :	
1 -	Exploit a range of learning resources.
2 -	Work on a team

ABET Course outcomes :	
1 -	Define and use standard data structures types.
2 -	Design computer applications using different data structures such as arrays, linked lists, stacks, queues, trees, and graphs.
3 -	Compare and contrast the advantages and disadvantages of dynamic and static data structure implementations.
4 -	Apply the appropriate data structures for given requirements.
5 -	Compare, select, and use appropriate algorithms for manipulating specific data structures, considering the complexity and performance characteristics.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Data structure basics and concepts	4	2	2
Arrays: Searching and Sorting Algorithms.	4	2	2
Stack using Arrays	4	2	2
Stack applications.	4	2	2
Quiz -1	2		
Queue using Arrays and its applications	4	2	2
Linked List	4	2	2
Doubly Linked List	4	2	2
Mid Term Exam	2		
Stack and Queue using Linked List	4	2	2
Tree , Binary Tree	4	2	2
BST and Graphs	4	2	2
Hash Tables	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :
Interactive Lectures including discussion
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)
Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00	3	
Final Exam	40.00	14	

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Midterm Exam (s)	20.00	9	
Quizzes	10.00	5	
Team Work Projects	20.00	7	

Course Notes :

Course Notes are available with all the slides used in lectures in electronic form on Learning Management System (Moodle)

Recommended books :

Michael T. Goodrich, Roberto Tamassia, David M. Mount, ñData Structures and Algorithms in C++, 2nd Editionò, 978-0-470-46044-3

Web Sites :

https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

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