Philadelphia University

Faculty of: Administrative & Financial Sciences

Department of Business Networking and Systems Management

Course Syllabus
Course Title : Data Structure
Course code: 0371313 , 3rd level
Course prerequisite (s) and/or co requisite (s):0371211
Credit hours:3
Lecture Time:

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Sundus A. Hamoodi	Assistant Prof.	32418/ Ext. No. 2441		SundusHamodi@yahoo.com

Course module description:

This module covers the fundamental data structures concepts. Topics include the underlying philosophy of data structure and Abstract Data Type (ADT), fundamental data structures, classification of data structures, space and time considerations, linked lists, stacks, queues, graphs, the basics of algorithmic analysis and understanding the principles of recursion. How to design and implement data structures using C++ programming language.

Teaching Methods:

D uration: 15 weeks in first semester, 45 hours in total
Lectures: 30 hours, 2 per week (2 of them are for the first and second 1 hour exams).
Laboratory: 15 hours, 1 per week

Learning Outcomes*:*

On successful completion of this module, student will:

1. Build on understanding of basic ideas about data structures given in the prerequisite module.
2. Understand basic ideas about algorithms.
3. Understand the basic concepts of time and space complexity.
4. Be able to manipulate recursive algorithms.
5. Be able to develop efficient algorithms for manipulating data structures.
6. Know a range of algorithm structures and how to implement them.
7. Know and understand a wide range of searching and sorting algorithms.
8. Understand how the Abstract Data Type (ADT) is used.
9. Understand several representations of trees, and their applications.
10. Understand several representations of graphs, and their applications, together with a selection of important algorithms on graph networks.
11. Be able to construct and use the data structures mentioned above.
12. Understand the basic concepts of network building using different data structure types For example: tree and graph notation.

Module Outline:

Week	Subject	
(1)	Introduction: Program style, Introduction to analysis of algorithm, Introduction to Abstract Data Type (ADT) approach	
(2)	Array, The ADT Array, The index function for sequential representation of arrays	Homework 1
(3)	Set, The ADT Set, An implementation of sets using arrays, Analysis of the array implementation of sets	
(4)	Stack, The ADT Stack, An array implementation of stacks, Analysis of the array implementation of stacks	
(5)	1st tutorial, Applications, Evaluating an expression in postfix form, Converting infix expression to postfix	Assignment 1
(6)	Queue, The ADT Queue ,An array implementation of	

First Examination	queues	
(7)	Analysis of the array implementation of queues, Applications, Testing Palindromes	
(8)	Recursion, Recursive algorithm, Removing recursion	
(9)	Linked Lists, The ADT Linked List, Implementation of singly linked lists	
(10)	Implementation of doubly linked lists, Implementation of circular linked lists, 2nd tutorial	Assignment 2
(11) Second Examination	Trees, Binary trees (BTs): General concepts, Traversal of BT	
(12)	The ADT Binary Search Tree (BST), Implementation of BST	
(13)	Graphs, The computer representation of the graphs, Graph search strategies: Depth-First Search (DFS) algorithm, Breadth-First Search (BFS) algorithm	Homework 2
(14)	Sorting, Selection sort, Insertion sort, Quick sort	
(15)	Searching, Sequential search, Binary search, Hashing	Assignment 3
(16) Final Examination	Tutorial, discussion and review	

Modes of Assessment:

Modes of Assessment:	**Score**	**Date**
First Exam	20%	
Second Exam	20%	
Quizzes, Assignments, Homework, and Tutorial contribution	20%	
Final Exam	40%	

Attendance Policy:
Lecture attendance is mandatory. Student is allowed maximally 15% absentia of the total module hours.
More than this percentage, student with an excuse will be drawn from the module. Otherwise, student will be deprived from the module with zero mark assigned.

Expected Workload

On average you should expect to spend at least (9) hours per week on this module.

Practical Submissions:

The assignments that have work to be assessed will be given to the students in separate documents including the due date and appropriate reading material

Textbooks and Supporting Materials:

(a) ***Textbook:***

`Data Structures Using C++, by D.S. Malik, 2nd Edition`

(b) ***Supporting Material:***

1. Robert L. Kruse, et al, Data Structures and Program Design in C++, Addison-Wesley, 2004.
2. Timothy Budd, Data Structures in C++ Using the Standard Template Library, 2001.