	Hashemite University Prince Al-Hussein bin Abdullah II Faculty for Information Technology Department of Computer Science and its Applications	

Course Syllabus

Year: 2018-2019 **Semester: (2)**

Course No.	Course Title	Designation	Prerequisite	Co-requisite	Credit Hours Lectures /Lab.
151001250	Data Structures	Compulsory	151001111	-	3 / 0

Instructor Name	E-mail	Office No.	Office ext.	Office Hours
Dr. Alaa Eddien Abdallah	aabdallah@hu.edu.jo	235	-	Sun, Tue (11-12)

Coordinator's Name:	Dr. Alaa Eddien Abdallah

Course Description	Presents fundamental techniques in the design and analysis of data structures that lie at the heart of computer science (e.g. data structures include: lists, stacks, queues, trees, priority queues, hashing, graphs, and search trees). Introduces algorithm design and analysis techniques such as recursion and formal methods for analyzing the time and space requirements of programs. Provide programming assignments that require students to apply the concepts introduced in classes in the development of rather large programs. Demonstrate awareness of current areas of research by locating and summarizing examples of recent progress.

a) Textbook(s):
1. Data Structures and Algorithms in Java, International Student Version, 6th Edition, Michael T. Goodrich, Roberto Tamassia, 2014.
b) References:
1. Data Structures and Abstractions with Java, 3rd Edition, Frank Carrano, 2011.
2. Data Structures in Java: From Abstract Data Types to the Java Collections Framework, Simon Gray, 2007.

Course Learning Outcomes (CLOs)
1) In-depth **understanding** of how to calculate the complexity of an algorithm or program written in Java. (1)
2) **Demonstrate** the benefits of using singly linked lists, doubly linked lists, rather than fixed size arrays. (1,2)
3) **Illustrate and distinguish** several data structures like stacks, queues, BST, AVL tree, and hashing. (1,2)
4) **Develop** a deep knowledge about the importance and the application of recursion. (1,2)
5) Be able to **apply** several data structures to write programs for real problems depending on the type of data and its application. (1,2)
Students Learning Outcome (SLOs)
1 and 2

Topic Details	Course ILO number	Reference	No. of Weeks	Contact hours*
1. Object-Oriented programming, Abstract data type (ADT), inheritance, Pointers		1, 2 (self-reading)	-	
2. Computational and Asymptotic complexity, Big-O Notation and its properties, the best, average, and worst cases	1	4	2	6
3. Singly linked lists, double linked lists	2,5	3	2	6
4. Stacks, queues	3,5	6	2	6
5. Recursion	4	5	2	6
6. Trees, Binary trees, tree traversal.	3,5	8	2	6
7. Binary search trees, insertion & deletion, AVL trees	3,5	11	3	9
8. Hash functions, collision resolution, deletion, perfect hash functions	3,5	10	1	3
Total			**14**	**42**

Assessment method	Grade	Comments
First Exam	25%	Covers Chapters 1,2,3,4
Second Exam	25%	Covers Chapters 5,6,8
Assignments	10%	TBA
Final Exam	40%	Covers all topics that were discussed during the semester
Total	100%	