



**Philadelphia University**  
**Faculty of Engineering**  
**Department of Computer Engineering**  
**First Semester, 2010/2011**

**Course Syllabus**

<b>Course Title:</b> Algorithms and Data Structures	<b>Course code:</b> 630231
<b>Course Level:</b> 2 <sup>nd</sup>	<b>Course prerequisite (s) and/or co requisite (s):</b> Object Oriented Programming (630205)
<b>Class Time:</b> 10:10-11:10 Sun, Tue, Thu	<b>Credit hours:</b> 3

**Academic Staff**

**Specifics**

<b>Name</b>	<b>Rank</b>	<b>Office Number and Location</b>	<b>Office Hours</b>	<b>E-mail Address</b>
Dr. Qadri Hamarsheh	Assistant professor	<b>E712</b>	<b>09:00-10:00</b> (Sun-Tue-Thu) <b>09:30-10:30</b> (Mon-Wed)	<a href="mailto:qhamarsheh@philadelphia.edu.jo">qhamarsheh@philadelphia.edu.jo</a>

**Course module description:**

This course introduces the fundamentals of structuring and manipulating data: sorting, searching, recursion, lists, stacks, queues, trees, graphs, tables. Introduction to the analysis of algorithms. Advancement in C++ skills and techniques.

**Course module objectives:**

- ❖ Understand algorithms, time complexity and space calculating
- ❖ Understand the sorting and searching fundamentals.
- ❖ Describe and /or define the Abstract Data Types; including lists, stacks, queues, trees, hash tables and graph.
- ❖ Understand, explain, demonstrate, and evaluate alternate implementations of examples of the methods associated with Abstract Data Types.
- ❖ Implement and test Abstract Data Types in generic programs using C++.

**Course/ module components**

- ❖ Data structures using C++, D.S. Malik, Course Technology, 2nd edition, 2010, ISBN: 13-978-1-4390-4023-2
- ❖ Books (title, author (s), publisher, year of publication)  
C++ How to Program, 3<sup>rd</sup> By Deitel & Deitel, prentice-Hall, 2001, ISBN: 0-13-089571-7
- ❖ Support material (s) (vcs, acs, etc).
- ❖ Study guide (s) (if applicable)
- ❖ Homework and laboratory guide (s) if (applicable).

**Teaching methods:**

Duration: 16 weeks, 48 hours in total

Lectures: 32 hours, 3 per week

Homework: 7-8 homework assignments

**Learning outcomes:**

- Knowledge and understanding
  - ❖ Have a clear understanding of the Data Abstraction term.
  - ❖ Have a good knowledge of what comprises a correct program in C++.
  - ❖ Have knowledge of design guidelines.
- Cognitive skills (thinking and analysis).
  - ❖ Be able to design, code, and test C++ programs, which meet requirements expressed in English.
  - ❖ Have knowledge of design guidelines.
  - ❖ Be able to write algorithms for solving problems.
- Communication skills (personal and academic).
  - ❖ Be able to understand the documentation for, and make use of, the C++ library.
  - ❖ Be able to write a C++ program.
  - ❖ Be able to design, code, and test C++ programs, which meet requirements expressed in English.
- Practical and subject specific skills (Transferable Skills).
  - ❖ write computer programs to solve practical engineering problems
  - ❖ Design efficient computer programs to solve practical engineering problems

<b>Course Intended Learning Outcomes</b>									
<b>A - Knowledge and Understanding</b>									
A1.	A2.	A3.	A4.	A5.	A6.	A7.	A8.		
<b>B - Intellectual Skills</b>									
B1.	B2.	B3.	B4.	B5.	B6.	B7.	B8.	B9.	
<b>C - Practical Skills</b>									
C1.	C2.	C3.	C4.	C5.	C6.	C7.	C8.	C9.	C10.
<b>D - Transferable Skills</b>									
D1.	D2.	D3.	D4.	D5.	D6.	D7.			

**Assessment instruments**

- Short reports and/ or presentations, and/ or Short research projects
- Quizzes.
- Assignments.
- Final examination: 50 marks

<b><u>Allocation of Marks</u></b>	
Assessment Instruments	Mark
First examination	<b>15</b>
Second examination	<b>15</b>
Final examination: 50 marks	<b>50</b>
Reports, research projects, Quizzes, Assignments, Projects	<b>20</b>
Total	<b>100</b>

**Documentation and academic honesty**

- Documentation style (with illustrative examples)
- Protection by copyright (N/A)
- Avoiding plagiarism. (According to the university rules and regulations)

**Course/module academic calendar**

<b>week</b>	<b>Basic and support material to be covered</b>	<b>Homework/reports and their due dates</b>
(1)	<b>Programs complexity</b>	
(2)	<b>Sorting and Searching algorithms</b>	Building Several Functions to represent several sorting and searching algorithms
(3)	<b>Data representation : linear and linked lists</b>	Building linear linked list
(4)	<b>Arrays &amp; matrices</b>	
(5)	<b>Linear Stacks</b>	Building linear Stack with some extra functions
(6)	<b>First examination</b>	
(7) <b>First examination</b>	<b>Queue</b>	Building linear and Dynamic Queue and used it with a given applications
(8)	<b>Dynamic Stacks</b>	Building Dynamic stack and calculate time complexity for some methods.
(9)	<b>Priorities queue</b>	Building a dynamic Priorities Queue.
(10)	<b>Binary tree &amp; usual Tree</b>	
(11)	<b>Algorithm of converting trees</b>	
(12) <b>Second examination</b>	<b>Second examination</b>	Building an application using polymorphism
(13)		
(14)	<b>graphs</b>	Build a Graph and applied some searching algorithm to travels through all nodes
(15) <b>Specimen examination (Optional)</b>	<b>Hash tables</b>	Building and implementing Hash tables
(16) <b>Final Examination</b>		

**Expected workload:**

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

**Attendance policy:**

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

**Module references****Books**

- ❖ C programming for engineering& Computer Science H.H. Tan.McGraw- hill.1999
- ❖ C++ :An Introduction to Data Structures by Larry R. Nyhoff. Hardcover. 1999
- ❖ Algorithms and Data Structures in C++ . By Leendert Ammeraal. 1996.
- ❖ C++ How to program .By H.M.Deitel & P.J.Deitel. 2 ed , Prentice- hill, 1998.
- ❖ Data Structures and Algorithms in C++ ,1<sup>ST</sup> edition , by Michael T. Godrich, Roberto Tamassia, David M. Mount Michael T. Goodrich Wiley , 2002.

**Journals**

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**Websites**

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