	COE	312
Lebanese American University		
School of Engineering	Data Structures (required)	3 credits
Department of Electrical and Computer Engineering	MWF 09:00 AM – 09:50 AM	ENG 402
Course syllabus	Dr. Wissam F. Fawaz	Fall 2013

1.	**Course Description and Course Prerequisite**

Representing information is fundamental to computer engineering. To be practical in terms of storage requirements and running time, computer programs must organize their information in a way that supports efficient processing. For this reason, the study of data structures and the algorithms that manipulate them is at the heart of computer engineering.

This course provides an introduction to data structures and algorithms. More specifically, it touches on the basic principles underlying algorithm performance analysis and data structure design by covering algorithm analysis, stacks, queues, sequences, lists, priority queues, trees, maps and dictionaries.

Course prerequisites: COE 212 Engineering Programming.

2.	**Course Objectives**

At the conclusion of the course, students will be able to:
- Select the data structure that best meet their requirements.
- Effectively implement the various data structures covered by this course.
- Evaluate the relative efficiency of algorithms.
- Determine the basic operations that must be supported to solve a given problem and quantify the resource constraints for each operation.

3.	**Contribution of course to meeting the professional component**

Professional Component	Credits
Mathematics and Basic Sciences	1
Engineering Topic	2
General Education	0

4.	**Relationship of course to program outcomes (Tentative)**

PO (a) *an ability to apply knowledge of mathematics, science and engineering.*
- Applies knowledge of Engineering/(Computer Systems)

PO (c) *an ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.*
- Expresses unambiguous needs and identifies objectives and requirements
- Identifies realistic constraints related to the design effort
- Performs design or solve problems using knowledge and alternatives when applicable

PO (e) *an ability to identify, formulate, and solve engineering problems*
- Demonstrates the ability to formulate engineering problems, to recognize and identify the basic governing theories and principles in Computer Systems.

PO (k) *an ability to use the techniques, skills and modern engineering tools necessary for engineering practice*
- Uses computer programs necessary for engineering practice

5.	**Course Outline**

- Polymorphism
- Exception Handling
- Recursion
- Running Time Analysis
- Event-driven programming
- Stacks, queues, and linked lists
- Trees
- Maps and Dictionaries

6.	Required tools / software / skills

Students must know how to program in JAVA.

7.	Textbook[s]

Data Structures and Algorithms in Java, 5th Edition, by Goodrich and Tamassia, Wiley, 2011.

8.	Additional References

Robert Sedgewick, *Algorithms in Java,* Third edition, Addison Wesley, 2003.
Anany Levitin, *The Design and Analysis of Algorithms*, Addison Wesly, 2002.

9.	Schedule of Exams & Grading Percentage

Quizzes: 5%
Homework/projects: 20%
Exam 1:   20%
Exam 2:   25%
Final: 30%

10.	Course Policies

Cheating is considered to be a very serious breach of the cheating policy of the faculty and will not be tolerated. Students are expected to submit their own solutions to all homework assignments and programming projects. Solutions must be handed in at the beginning of the class in which they are due. Late assignments will not be accepted.

11.	General Comments

Instructor: Dr. Wissam FAWAZ   email: wissam.fawaz@lau.edu.lb
Office: 103, Bassil Bldg, ext: 2414
Office Hours: Monday, Wednesday and Friday, from 10:00 - 11:00 AM & 1:00 – 2:00 PM
Course webpage: http://www.wissamfawaz.com/data_structures.htm

12.	General Rules & Regulations

- A student can miss no more than the equivalent of 5 weeks of instruction. Students who exceed the allowed number of absences must withdraw from the course; otherwise, the course grade will be recorded as "F".
- Plagiarism: students caught cheating on an exam receive a grade of Zero on the exam in the first cheating attempt and a warning. Students caught cheating for the second time in the same course receive an F grade in the course and a second warning. A grade of zero on an exam resulting from cheating must be counted in the student's course grade. The zero cannot be dropped in computing the final grade in case the instructor has a policy of allowing students to drop their worst exam grade.
- Any student who receives 3 warnings will be suspended.