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| **Course Name:** | Objects and Data Abstraction | **CSC 245** |
| **Class Time and Location** | Lecture:MWF 1:00 PM - 1:50 PM Sage Hall 110  Lab: F 4:30 PM – 7:00 PM (Sage 110) |
| **Credits Hours:** | 3 |
| **Semester:** | Spring 2013 | |
| **Last Revised on:** | February 1, 2013 | |

Instructor

***Name:*** Dr. Azzam Mourad

***Email:*** azzam.mourad@lau.edu.lb

***Course Page*:** Blackboard

***Office:*** OG 408 Ext. 1200

***Office Hours:*** MWF 12:00 pm – 1:00pm

M 2:00 pm – 6:00 pm

W 2:00 pm – 4:30 pm

(Or by appointment)

**Current Catalog Description**

This course presents further techniques of object oriented programming and problem solving with emphasis on abstraction and data structures. Topics include: Object oriented concepts such as composition, inheritance, polymorphism, text files, information hiding, and interfaces; basic program design and correctness: abstract data types, preconditions and post conditions, assertions and loop invariants, testing, basic exception handling, and the application of algorithm design techniques. The course also covers basic algorithmic analysis; time and space tradeoffs in algorithms; big-O notation; fundamental data structures and applications such as collections, single- and double-linked structures, stacks, queues, and trees; performance issues for data structures; recursion; more sorting algorithms.

Course Prerequisite/Co-requisite

CSC243 Introduction to Object Oriented Programming.

**Textbook**

E. Koffman, P. Wolfgang. *Objects, Abstraction, Data Structures and Design using Java*. Wiley 2010.

**References**

* Deitel and Deitel. *JAVA How to Program*. Prentice-Hall.
* http://he-cda.wiley.com/WileyCDA/HigherEdTitle/productCd-0471692646.html
* M. Main. *Data Structures and Other Objects using Java*. Addison-Wesley.
* Goodrich and Tamassia. *Data Structures and Algorithms in Java*. Wiley.

**Course Type**

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| **R**equired |  | **E**lective |  | **S**elective **E**lective |  |

**Course Learning Outcomes**

CLO1. Students shall learntext files and basic exception handling in Java.

CLO2. Students shall learn abstract data types, interfaces, information hiding, method specification, preconditions and post conditions, assertions and loop invariants, testing.

CLO3. Students shall learn algorithmic analysis; time and space tradeoffs in algorithms; big-O notation.

CLO4. Students shall learn data structures and applications: references, single- and double-linked structures; implementation strategies (arrays and linked lists) for stacks, queues, graphs, and trees; performance issues for data structures.

CLO5. Students shall learn how to think recursively and design recursive solutions; base cases and recursion steps.

CLO6. Students shall learn comparing searching and sorting algorithms: bubble sort, insertion sort, recursive binary search and merge-sort.

**Student Outcomes Addressed in this Course**

All the CLOs

Teaching Method

* Lectures, programming assignments, lab tutorials and drop quizzes.
* Attending the lab is mandatory.
* Programming practice at home is extremely needed.

Course Grading and Performance Criteria (Subject to 5% variation)

* Labs + Programming assignments + Attendance 20%
* Exams I and II 45 %
* Final exam 35%

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| **Grade** | **Quality Points** | **Guidelines over 100** |
| A | 4 | >= 90 |
| A- | 3.67 | 87-89 |
| B+ | 3.33 | 83-86 |
| B | 3.0 | 80-82 |
| B- | 2.67 | 77-79 |
| C+ | 2.33 | 73-76 |
| C | 2 | 70-72 |
| C- | 1.67 | 67-69 |
| D+ | 1.33 | 63-66 |
| D | 1 | 60-62 |
| F | 0 | <=59 |

**Topics Covered in the Course**

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| **Week** | **Lecture / activity** | **Textbook- Chapter** |
| 1 | Data Abstraction and Encapsulation | Deitel – 8 |
| 2 | Class composition | Deitel - 8 |
| 3 – 4 | Object-Oriented Programming: Inheritance | Deitel - 9 |
| 4 – 5 | Object Oriented Programming: Polymorphism | Deitel - 10 |
|  | **Exam I** |  |
| 6 – 7 | Basic Exception Handling  Testing and debugging  Assertions and loop invariants  Efficiency of algorithms - Big O notation | Deitel - 13 |
| 8 | File Processing | Handout – Deitel - 14 |
| 9 | String Manipulation | Handout |
| 10-11 | Linked lists | Koffman&Wolfgang – 2 |
| 12 | Stacks | Koffman&Wolfgang – 3 |
|  | **Exam II** |  |
| 13 | Queues | Koffman&Wolfgang – 4 |
| 14 | Introduction to recursion. | Koffman&Wolfgang – 5 |
| 14 | Introduction to trees | Koffman&Wolfgang – 6 |
|  | **Final** |  |

#### **Policy on Cheating and Plagiarism**

Students caught cheating on an exam receive a grade of zero on the exam in their first cheating attempt and receive a warning. Students caught cheating for the second time will receive a grade of “F” in the course and another warning. Plagiarism on assignments and project work is a serious offense. If plagiarism is detected, a student will be subject to penalty, similar to the cheating case, which ranges from receiving a zero on the assignment concerned to an “F” in the course in addition to a warning.

#### **Attendance Policy**

1. Students are held responsible for all the material presented in the classroom, even during their absence.
2. Students can miss no more than the equivalent of five weeks of instruction and still receive credit for that course.
3. Instructors have the right to impose specific attendance regulations in their courses, provided that the above-stated limit of absences is not exceeded, and the minimum number of absences allowed is no fewer than the equivalent of two weeks of classroom instruction, after the Drop and Add period.
4. Instructors will inform the Departments Chairperson and the Guidance Office, of any prolonged unexplained absence.
5. Students who exceed the allowed number of absences must withdraw from the course; otherwise, the course grade will be recorded as “F” (NP).

**Withdrawal policy**

Students wishing to withdraw from one or more courses must follow the withdrawal procedure provided by the Registrar’s Office. It is the student’s responsibility to drop the course.

- A student who withdraws after the Drop/Add period and by the end of the 5th week of classes (10th day of classes for Summer Modules) will obtain a “WI” on that particular course. The student may process such request directly through the Registrar’s Office.

- A student who withdraws from a course between the 6th week and the end of the 10th week of classes (18th day of classes for Summer Modules) will receive either a “WP” or a “WF”. “WP” or “WF” will be determined by the instructor based on the achieved academic performance in that course till the time of withdrawal.

- The “WI” and the “WP” will not count as a repeat; whereas the “WF” will count as a repeat.

- “WI”, “WP” and “WF” will not count towards the GPA calculation.

- The deadlines for “WI” or “WP”/”WF” are clearly stated on the revised academic calendar on the LAU website: <http://www.lau.edu.lb/academics/calendar/20122013/#spring_2013>

WI is equivalent to Early Withrwal: Deadline March 15, 2013

WP is equivalaent to Withdrawal/Pass: Deadline April 25, 2013

WF is equivalent to Withdrawal/Fail: Deadline April 25, 2013

**Course Evaluation**

Completion of the online course evaluations is required. Students will not be able to access their course grades until they have completed the course evaluations.

**Remarks**

* **Reading the textbook is a must**.
* **Attending the labs is mandatory.**
* Deadlines for the assignments **must be respected**.
* Make-ups and Incomplete: students are not automatically entitled to make-ups; F will be given until reasons (in writing and within one week of absence) are presented and approved.
* Some of the exam questions will be based on class discussion and assignments.
* No mobile phones and Laptops in the classroom and exams.