



**Lab:** Object-oriented Engineering Problem Solving with Java- Lab: – 0907342 (0 Credit hours)

**Catalog Data:** This lab is done to handle experiments that concerns about solving different engineering problems using object-oriented fashion. All labs (i.e. programming problems or experiments) are expected to be solved using Java programming language. In this lab, the Sun Solaris is the operating system adapted. In the beginning, the student will practice simple UNIX commands (Solaris commands) and basic programming concepts and structures. After that, many experiments related to Java object-oriented features, graphical user interface, streams, exceptions, and multithreading will be practiced.

**Prerequisites by Course:** Computer Skills (1&2): 1900100 & 1901102.

**Prerequisites by Topic:** Introduction to computers, programming, and logical operations.

**Co-requisite:** Object Oriented Engineering Problem Solving

**Textbook:** Paul Deitel and Harvey Deitel, *Java How To Program (Early Objects)*, 10<sup>th</sup> Edition, Prentice Hall, March 2014.

**References:**

- Herbert Schildt, *Java: A Beginner's Guide*, 6<sup>th</sup> Edition, McGraw-Hill Education, May 2014.
- Adnan Aziz, Tsung-Hsien Lee, and Amit Prakash, *Elements of Programming Interviews in Java: The Insiders' Guide*, CreateSpace Independent Publishing Platform, September 2015.
- Herbert Schildt, *Java: The Complete Reference*, 9<sup>th</sup> Edition, McGraw-Hill Education, April 2014.
- Y. Daniel Liang, *Intro to Java Programming, Comprehensive Version*, 10<sup>th</sup> Edition, Pearson, January 2014.
- Paul Deitel and Harvey Deitel, *Java How To Program (Early Objects)*, 10<sup>th</sup> Edition, Prentice Hall, March 2014.
- Joyce Farrell, *Java Programming*, 7<sup>th</sup> Edition, Course Technology, January 2013.
- Ralph Morelli, Ralph Walde, *Java, Java, Java: Object-oriented Problem Solving*, 3<sup>rd</sup> Edition, Prentice Hall, 2005.
- José M. Garrido, *Object-Oriented Programming: From Problem Solving to Java*, 1<sup>st</sup> Edition, Charles River Media, 2003.
- Nell Dale, Chip Weems, and Mark Headington, *Programming and Problem Solving with Java*, 2<sup>nd</sup> Edition, Jones & Bartlett, April 2007.

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| <b>Lab Website:</b>  | <a href="http://eacademic.ju.edu.jo/k.darabkeh/Material">http://eacademic.ju.edu.jo/k.darabkeh/Material</a>  |                    |     |  |                     |     |     |                   |     |     |
| <b>Schedule &amp; Duration:</b>                            | 16 Weeks, 9 labs, three hours each (including exams).  |                    |     |  |                     |     |     |                   |     |     |
| <b>Minimum Student Material:</b>                           | Text book, class handouts, some instructor keynotes, calculator and access to a personal computer and internet.  |                    |     |  |                     |     |     |                   |     |     |
| <b>Minimum College Facilities:</b>                         | Classroom with whiteboard and projection display facilities, library, and computational facilities.  |                    |     |  |                     |     |     |                   |     |     |
| <b>Lab Objectives:</b>                                     | The objectives of this lab are: <ol style="list-style-type: none"> <li>1. Introduce students to object-oriented principles.</li> <li>2. Introduce students to object-oriented programming using Java.</li> <li>3. Introduce students to Java software development kit along with an interactive tool.</li> </ol>   |                    |     |  |                     |     |     |                   |     |     |
| <b>Lab Outcomes and Relation to ABET Program Outcomes:</b> | Upon successful completion of this course, a student should be able to: <ul style="list-style-type: none"> <li>✓ Use Java software development kit or other relevant engineering tools [k]</li> <li>✓ Implement object oriented programs and understand the underlying principles such as encapsulation, abstraction and reuse. [b]</li> <li>✓ Design and build more complex programs (multiple files and multiple objects). [b]</li> <li>✓ Identify, formulate, and solve engineering problems [e]</li> </ul>   |                    |     |  |                     |     |     |                   |     |     |
| <b>Experiments:</b>  | <ul style="list-style-type: none"> <li>• Lab 1: Java Language Essentials I</li> <li>• Lab 2: Java Language Essentials II</li> <li>• Lab 3: Operators, Arithmetic Promotion, Method Calling, and Shallow Polymorphism</li> <li>• Lab 4: Dealing with Arrays</li> <li>• Lab 5: Classes: String and Math</li> <li>• Lab 6: Inheritance and Polymorphism</li> <li>• Lab 7: Garbage collection, packaging, access Modifiers, as well as static and abstract modifiers</li> <li>• Lab 8: Interfaces, block initializers, final Modifier, as well as static and dynamic binding</li> <li>• Lab 9: Exception Handling</li> </ul> |                    |     |  |                     |     |     |                   |     |     |
| <b>Computer Usage:</b>                                     | Practical Java experiments/programs will be practiced in this lab.   |                    |     |  |                     |     |     |                   |     |     |
| <b>Attendance:</b>   | Lab attendance will be taken every class and the university's policies will be enforced in this regard.  |                    |     |  |                     |     |     |                   |     |     |
| <b>Assessments:</b>  | Exams.   |                    |     |  |                     |     |     |                   |     |     |
| <b>Grading policy:</b>                                     | <table> <tr> <td>In-lab Performance</td> <td>15%</td> <td></td> </tr> <tr> <td>In-lab Midterm Exam</td> <td>10%</td> <td>TBA</td> </tr> <tr> <td>In-lab Final Exam</td> <td>15%</td> <td>TBA</td> </tr> </table>   | In-lab Performance | 15% |  | In-lab Midterm Exam | 10% | TBA | In-lab Final Exam | 15% | TBA |
| In-lab Performance   | 15%  |                    |     |  |                     |     |     |                   |     |     |
| In-lab Midterm Exam  | 10%  | TBA                |     |  |                     |     |     |                   |     |     |
| In-lab Final Exam  | 15%  | TBA                |     |  |                     |     |     |                   |     |     |
| <b>Instructor:</b>   | Prof. Dr. Khalid A. Darabkh<br>Email: <a href="mailto:k.darabkeh@ju.edu.jo">k.darabkeh@ju.edu.jo</a><br>Office Hours: Sun, Tue, and Thu: 12:00 – 1:00 pm or by appointment.  |                    |     |  |                     |     |     |                   |     |     |
| <b>Lab Assistants</b>                                      | Eng. Alaa Thaher<br>Office Hours: T and Thu: 12:00 – 1:00 pm   |                    |     |  |                     |     |     |                   |     |     |

**Lab Time and Location:** Section 1: Sun 1:00 – 4:00 **Computer Applications lab**  
 Section 2: Tue 1:00 – 4:00 **Computer Applications lab**  
 Section 3: Thu 1:00 – 4:00 **Computer Applications lab**

**Program Outcomes (PO)**

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|----------|--|
| <b>a</b> | An ability to apply knowledge of mathematics, science, and engineering   |
| <b>b</b> | An ability to design and conduct experiment as well as to analyze and interpret data.  |
| <b>c</b> | An ability to design a system, component, or process to meet desired needs , within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. |
| <b>d</b> | An ability to function on multidisciplinary teams  |
| <b>e</b> | An ability to identify, formulate, and solve engineering problems  |
| <b>f</b> | An understanding of professional and ethical responsibility.   |
| <b>g</b> | An ability to communicate effectively  |
| <b>h</b> | The broad education necessary to understand the impact of engineering solutions in a gloabal, economic, environmental, and societal context  |
| <b>i</b> | A recognition of the need for, and an ability to engage in life-long learning  |
| <b>j</b> | Knowledge of contemporary issues   |
| <b>k</b> | An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice  |

**Last Updated:** SEPT 4, 2016