

Polytechnic University of Puerto Rico
Department of Electrical Engineering
Master in Electrical Engineering

Course Syllabus

- Title** : Object Oriented Design
- Code** : CECS - 6150
- Credits** : Three (3) Credits
- Duration** : Forty-five contact-hours per course
- Prerequisites** : None

Description

The object oriented paradigm is covered including all its fundamental concepts. Students write programs at increasing levels of complexity that illustrate the principles of encapsulation, data abstraction, constructors, inheritance, overloading, overriding polymorphism, and dynamic binding. Various types of OO Models such as structural and behavioral, are elaborated using UML. Design patterns are introduced. The course assumes familiarity with structured programming techniques, compilation and debugging tools.

Justification

The object oriented paradigm has become the lingua-franca of most design and development activities. A thorough knowledge of its core set of concepts is indispensable for successfully understanding technical literature, specifications, textbooks, and to carry out meaningful technical communications with other computer engineers and scientists.

Objectives

1. Understand the concepts and terminology of object oriented design and programming.
2. Understand how to take advantage of the many features of the OOP, such as single and multiple inheritance, polymorphism, overloading, overriding, dynamic binding, interfaces, and abstract classes.
3. Understand the role that the object oriented design paradigm occupies within the context of other techniques for software specifications and design.
4. Learn to model different aspects of the objects in a problem domain using UML models.

Course Outline

1. Background to the invention of Object Oriented Design techniques

2. Classes and objects
3. Modeling the problem space using objects
4. Object creation, destruction and identity
5. Inheritance and reuse
6. Aggregation and has-a relationships
7. Overloading
8. Overriding
9. Polymorphism
10. Application architectures and Frameworks
11. GUI libraries and packages
12. Threads
13. Locking
14. UML notation principles
15. Software engineering principles

Required Textbook

Thinking in Java, 3rd Edition (2002)
By Bruce D. Eckel
Prentice Hall, Incorporated
ISBN: 0131002872
(free web-based version available)

Evaluation Criteria

1. Students will have two partials and a final test, and will also implement three projects illustrating the principles discussed in the class.
2. The grade distribution will be as follows:
 - Three tests (45%)
 - Three projects (55%)

Final course grade in the course will be determined based on the following scale:

100 - 90 A
89 - 80 B
79 - 70 C
69 - 60 C
69 - 0 F

Revision History

May 22, 2002; prepared by Othoniel Rodriguez-Jimenez, P.E. Ph.D.
January 2003; revised by Alfredo Cruz-Triana, Ph.D.
March 2004; revised by Othoniel Rodriguez-Jimenez, P.E., Ph.D.

Bibliography

JAVA, How to Program (2002)
4th Ed.
Deitel, H.M., Deitel, P.J.
Prentice-Hall
ISBN 0-13-0345151-7

UML Distilled: A brief guide to the Standard Modeling Language, 3rd Edition
Fowler, Martin
Pearson International Inc.
ISBN 0-321-19368-7

JAVA An introduction to Computer Science and Programming (2003)
3rd Ed.
Savitch, Walter
Prentice-Hall Inc.
ISBN 0-13-101378-5

*JAVA Software Solutions:
Foundations of Program Design* (2003)
3rd Ed.
John Lewis, William Loftus,
Pearson Addison Wesley
ISBN 0-321-197194

JAVA An Introduction to Computing (2001)
Adams, J., Nyhoff, L., Nyhoff, F
Prentice-Hall
ISBN 0-13-014251-4

*JAVA by Dissection:
The essentials of Java Programming* (2001)

Ira Pohl, Charlie McDowell
Addison Wesley
ISBN 0-201-61248-8