

## COP 5339 Object Oriented Software Design

**Credits:** 3 credits

**Text book, title, author, and year:** Cay Horstmann, "Object Oriented Design & Patterns", 2nd Ed., Wiley, 2005 ISBN 0-471-74487-5 Textbook webpage:  
[http://www.horstmann.com/design\\_and\\_patterns.html](http://www.horstmann.com/design_and_patterns.html)

### Reference materials:

1. Textbook webpage: [http://www.horstmann.com/design\\_and\\_patterns.html](http://www.horstmann.com/design_and_patterns.html)
2. Textbook problem solutions: <http://www.horstmann.com/oodp2/solutions/solutions.html>
3. Java Tutorial from Oracle: <http://docs.oracle.com/javase/tutorial/index.html>
4. Craig Larman, "Applying UML and Patterns", 3rd edition, Prentice Hall, 2004. (still a great reference for UML and patterns)
5. Erich Gamma et al. "Design Patterns", Addison-Wesley Professional; 1st edition, 1995

### Specific course information

**Catalog description:** Brief introduction to Java; software development process; functional specification and use cases; Unified Modeling Language diagrams; design methodology; OO design principles; implementation in Java; design patterns; Java applet framework; advanced Java topics: reflection, serialization, multithreading, generics. For the term project students will implement a real-world application passing through all software development stages.

**Prerequisites:** COP 3530 Data Structures and Algorithm Analysis

### Specific goals for the course:

1. understand and apply the methods of object-oriented design and programming in the context of the software development cycle
2. demonstrate the use of Unified Modeling Language (UML) diagrams for analysis and design of object-oriented software
3. learn elements of the Java programming language and implement object-oriented designs in Java
4. understand the basic concepts for design patterns and apply several common design patterns to improve the quality of software architectures
5. write programs using advanced features of the Java programming language, such as reflection, multithreading, and generics
6. design and develop applications using existing industry-standard Java frameworks, such as Google Android or web Java servlets or web services

### Brief list of topics to be covered:

Introduction to Java (Ch. 1)
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Object-oriented Design Process (Ch. 2)
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Guidelines for Class Design (Ch. 3)
Interface Types and Polymorphism (Ch. 4)

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Patterns and GUI Programming (Ch. 5)
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Inheritance and Abstract Classes (Ch. 6)
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The Java Object Model (Ch. 7)
Frameworks (Ch. 8);
Multithreading (Ch. 9)
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