

CSE 4221 (Approved): Introduction to Object-Oriented Programming

Course Description

Introduction to object-oriented programming for experienced procedural programmers; interfaces, classes, packages; implements and extends relationships; design patterns; best practices.

Prior Course Number: CSE 502

Transcript Abbreviation: Intr OO Pgmng

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Graduate

Student Ranks: Masters, Doctoral

Course Offerings: Autumn

Flex Scheduled Course: Never

Course Frequency: Every Year

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 3.0 hr Lec

Expected out-of-class hours per week: 6.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: Previous programming experience in a procedural language

Exclusions: Not open to CSE or CIS majors; not open to students with credit for CSE 502

Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No

The course is a GEC: No

The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.0901

Subsidy Level: Doctoral Course

General Information

Java is taught and used

Course Goals

Be competent with using control structures, built-in types, and OO program units of Java (interface, class, and package), and relationships (implements and extends), to write application program.

Be familiar with using reference types/variables, and with handling the problems they create compared to value types/variables.

Be familiar with designing and developing new interfaces, classes, and packages.
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Be familiar with using some of the most important object-oriented design patterns.
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Be familiar with using UML class diagrams.
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Be familiar with using formal specifications in interfaces.

Be exposed to the virtual machine model of modern computer systems.

Be exposed to software engineering issues.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to the course; component-based software and component relationships; UML class diagrams; Java control structures, built-in types, I/O; specifications with preconditions and postconditions; reasoning about program behavior; testing	14.0							
Interfaces, classes, and packages; reference types/variables and the problems they cause vis-a-vis value types/variables; template method pattern; abstract factory pattern	18.0							
Graphical user interfaces; event handling; observer pattern	9.0							

Representative Assignments

Write a program (using a language and programming style you already know) to find the area of a simple polygon, and test it
Write a program in Java to compute the n-th root of a real number using a numerical algorithm of choice, and test it
Extend a natural number component family, and test it
Implement a natural number calculator with graphical user interface, and test it
Implement a natural number component, and test it
Implement a numerical integration component in two different ways, and test it

Grades

Aspect	Percent
Lab assignments	42%
Homeworks	4%
Class participation	4%
Midterm exam	25%
Final exam	25%

Representative Textbooks and Other Course Materials

Title	Author
<i>Core Java 2: Volume 1 - Fundamentals</i>	Horstmann and Cornell

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
*	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
*	g	An ability to communicate effectively.

Course Contribution		College Outcome
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
*	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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