IT-2651: OBJECT-ORIENTED PROGRAMMING

Cuyahoga Community College

Viewing: IT-2651 : Object-Oriented Programming

Board of Trustees:
January 2026

Academic Term:
Summer 2026

Subject Code
IT - Information Technology

Course Number:
2651

Title:
Object-Oriented Programming

Catalog Description:
Introduction to object-oriented programming using the Java programming language. Emphasis on classes, objects, inheritance, polymorphism, and encapsulation. Students design, code, test, and debug Java applications. Additional topics include exception handling, event-driven programming, and graphical user interface (GUI) components.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
IT-1051 Introduction to Programming.

Outcomes

Course Outcome(s):
Design, write and test application using the latest Java syntax and object-oriented programming methodologies.

Objective(s):

1. Explain the core principles of object-oriented programming.
2. Demonstrate the ability to create user-defined types (classes) and instantiate programming objects.
3. Create object-oriented solutions that use class inheritance to create subclasses.
4. Utilize advanced object-oriented techniques, such as abstract classes and interfaces.
5. Design solutions implementing simple data structures such as a linked list or queue, to store and manage a collection of values.
6. Implement a search and sort algorithm, and explain the differences in their time complexities.
7. Demonstrate the ability to evaluate algorithms, to select a range of possible options to implement the algorithm in a particular context.
8. Analyze and apply recursive programming techniques.

Methods of Evaluation:

1. Class participation and discussion
2. Oral and/or written reports
3. Lab Assignments

4. Exams
5. Quizzes

Course Content Outline:

1. Object-oriented programming
   a. Terminology
   b. Classes and objects
   c. Instantiation
   d. Encapsulation
   e. Composition
   f. Inheritance
   g. Polymorphism
   h. Interfaces
   i. Scope
2. Java language concepts
   a. Terminology and syntax
   b. Variables and constants
   c. Data types
   d. String methods
   e. Operators
   f. Exception handling
   g. Garbage collection
   h. Java Virtual Machine
3. Methods
   a. Parameters / Arguments
   b. Returning values
   c. Overloading
   d. Constructor method
   e. Recursion
4. Control structures
   a. If - else statement
   b. Switch statement
   c. While statement
   d. For statement
   e. Do while statement
   f. Nested structures
5. Arrays
   a. Declaring and initializing
   b. Searching arrays
   c. Passing arrays to methods
   d. Multidimensional arrays
6. Lists
   a. ArrayList
   b. LinkedList
   c. Stack
   d. Queue
7. Algorithm
   a. Sort
   b. Search
   c. Evaluate
8. GUI
   a. Controls
   b. Arrangement / Alignment
   c. Frameworks / Environments
   d. Canvas
9. Files
   a. Reading
   b. Writing

c. Text files
d. Serialized files

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

Weekly Schedule

	Topics
Week 1	Introduction to course. Objectives and Guidelines Overview of Object Oriented Programming Installing and Using the NetBeans IDE or Eclipse
Week 2	The core components of (nearly) all Object Oriented Classes • Properties • Methods • Constructor methods • Encapsulation • Classes vs Objects
Week 3	Method Overloading Composition / Aggregation The toString method
Week 4	Arrays and Lists
Week 5	Graphical User Interfaces (JavaFX)
Week 6	Graphical User Interfaces (JavaFX)
Week 7	Inheritance Polymorphism Interfaces
Week 8	File reading and writing
Week 9	Scope Enumerators String Methods
Week 10	Data Structures
Week 11	The Final Project
Week 12	The Final Project
Week 13	The Final Project
Week 14	The Final Project
Week 15	The Final Project
Week 16	Final Exam

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

Readings will be from supplemental articles and online resources, as selected by the individual instructors.

Resources for the Instructor

Farrell, J. (2022) *Java programming*, Cengage.

Savitch, W. J., & Mock, K. (2015) *Absolute Java*, Addison-Wesley.

Liang, Y. D. (2020) *Introduction to Java programming and data structures, comprehensive version*, Pearson.

Horstmann, C. S. (2024) *Core Java: Fundamentals, Volume 1*, Oracle Press.

Lewis, J., DePasquale, P., Chase, J. (2019) *Java Foundations: Introduction to Program Design and Data Structures*, Pearson.

Gaddis, T., Muganda, G. (2019) *Starting Out with Java: From Control Structures through Data Structures*, Pearson.

Additional Resources for the Instructor

Oracle (n.d.). Dev.Java. Dev.Java. https://dev.java/
Oracle (n.d.). Java SE at a Glance. Java SE at a Glance. https://www.oracle.com/java/technologies/java-se-glance.html
Oracle, King's College London (n.d.). BlueJ Java Development Environment. BlueJ. https://www.bluej.org
Apache Software Foundation (n.d.). Apache NetBeans. https:/netbeans.apache.org
Microsoft (n.d.). Visual Studio Code. https://code.visualstudio.com
JetBeans (n.d.). IntelliJ IDEA. https://www.jetbrains.com/idea/
Replit, Inc. (n.d.). Replit. https://replit.com

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