JOHNS HOPKINS
CENTER *for* TALENTED YOUTH

# Introduction to Java Programming

## Course Overview

This course introduces students to the basic features of the Java programming language. Students will learn about Java primitive and non-primitive data types, control flow constructs, built-in class libraries, Java applets, and object-oriented programming concepts such as classes, objects, method overloading and encapsulation. Typical assignments and projects include using built-in and programmer-defined classes, performing basic input and output operations, and solving programming problems like Morse code translation and simulation. At the end of the course, students submit a comprehensive final examination.

The course syllabus provides an outline of the course that can be used as a guide when progressing through the learning topics of the course. Students are encouraged to take full advantage of discussion forums and other course activities online that can be helpful in their studies.

## Course Materials

The core textbook for the course can be purchased online.

*Introduction to Java Programming*, *Comprehensive Version*, by Y. Daniel Liang [10th Edition, Prentice Hall, 2014] ISBN 01337613123

Students who have the previous edition of the textbook can continue to use it. Reading assignments for each unit are listed for both editions.

## Course Grading and Assessment

Students will receive grades for assignments, quizzes, the final project and the final exam. Assignments are evaluated on effort and accuracy. Point values are as follows:

| | |
|---|---|
| Assignments | 30 points (2.5 points each) |
| Unit Quizzes | 36 points (3 points each) |
| Final Exam | 14 points |
| Projects | 20 points (10 points each) |
| TOTAL = | 100 points* |

| | | | | | |
|---|---|---|---|---|---|
| **A+** | 100-98% | **B+** | 89-87% | **C+** | 77-79 |
| **A** | 97-93% | **B** | 86-83% | **C** | 73-76 |
| **A-** | 92-90% | **B-** | 82-80% | **C-** | 70-72 |

* Students must receive a score of 70 percent (70 points) or above to pass the course

# Course Schedule

## Unit 1: Getting Started

Computing Concepts
Java History & Architecture
The Structure of a Java Program
Installing the Java Development Kit (JDK)
Compiling & Running a Java Program

**Reading:**
(10th Edition) Chapter 1.1 - 1.10
(9th Edition) Chapter 1.1 – 1.11

## Unit 2: Introduction to Java

Declaring & Initializing Java Variables
Rules for Java Variable Names
The Scope & Lifetime of Variables
Source Code Comments
Doing Basic Program Output

**Reading:**
(10th Edition) Chapter 2.1 – 2.12
(9th Edition) Chapter 2.1 – 2.12

## Unit 3: Java Programming Basics

Java Primitive Types
Basic Arithmetic Operators
Precedence & Order of Evaluation
Defining & Using Constants
Mixed Mode Expressions & Type Conversion

**Reading:**
(10th Edition) Chapter 2.1 – 2.12, 2.15 – 2.18
(9th Edition) Chapter 2.1 – 2.12, 2.15 – 2.17

## Unit 4: Program Decision Making

Relational Operators & Expressions
The if-else Construct
The switch Construct
The Conditional Operator

**Reading:**
(10th Edition) Chapter 3.1 – 3.9, 3.13 – 3.16
(9th Edition) Chapter 3.1 – 3.10, 3.14 – 3.17, 3.19

## Unit 5: More Java Operators

Increment & Decrement Operators
Arithmetic Assignment Operators
Logical Operators
Bitwise Operators

**Reading:**
(10th Edition) Chapter 2.13 – 2.14, 3.10 – 3.12, Appendix G
(9th Edition) Chapter 2.13 – 2.14, 3.11 – 3.13, Appendix G

## Unit 6: Iteration Constructs

The for Construct
The while Construct
The do-while Construct
Comparing Java Iteration Constructs
Nested Iteration Constructs
Additional Iteration Topics

**Reading:**
(10th Edition) Chapter 5
(9th Edition) Chapter 4

## Unit 7: Introduction to Java Class Methods

Defining Class Methods
Scope of Method Arguments & Variables
Passing Arguments to Class Methods
Returning Values From Class Methods
Type Conversion & Type Checking
Some Built-In Java Class Methods

**Reading:**
(10th Edition) Chapter 6
(9th Edition) Chapter 5

## Unit 8: Arrays

Creating & Using Arrays
Passing Arrays As Method Arguments
Returning Arrays From Methods
Multi-Dimensional Arrays
Referencing Arrays Dynamically

**Reading:**
(10th Edition) Chapter 7.1 - 7.8, Chapter 8
(9th Edition) Chapter 6.1 – 6.8, Chapter 7

## Unit 9: Working With Java Strings

The Java String Class
Creating & Using String Objects
Manipulating Strings
String Immutability & Equality
Passing Strings To & From Methods
String Arrays
The StringBuffer Class

**Reading:**
(10th Edition) Chapter 4, Chapter 10.10 – 10.11
(9th Edition) Chapter 9

## Unit 10: Introduction to Object-Oriented Programming - 1

Object-Oriented Programming Basics
Defining & Using Classes
Controlling Access to Class Members
Class Constructors
Method Overloading

**Reading:**
(10th Edition) Chapter 9.1 – 9.5, 9.7 – 9.14, Chapter 10
(9th Edition) Chapter 8.1 – 8.5, 8.7 – 8.11, Chapter 10

## Unit 11: Introduction to Object-Oriented Programming - 2

Basic Design Guidelines
Reusing Classes
Using Objects with Methods
Using Arrays of Objects
Class Variables & Class Methods

**Reading:**
(10th Edition) Chapter 9.1 – 9.5, 9.7 – 9.14, Chapter 10
(9th Edition) Chapter 8.1 – 8.5, 8.7 – 8.11, Chapter 10

## Unit 12: Finishing Up

Final Exam

## Assignments

There will be 12 assignments for this course. Each of these assignments is based on information from the textbook and lessons. Be sure to follow the assignment instructions carefully and make a checklist of all required components before submitting. All assignments must include both your full name and student ID.

## Unit Quizzes

There are quizzes for each unit that will consist of content from the textbook and lessons. It is recommended to take a practice quiz prior to a unit quiz to identify weak areas.

## Final Exam

The final exam will be based on content from the textbook and lessons. All assignments must be submitted and quizzes must be taken prior to taking the final exam.

## Final Project

There are two final projects. The first project will be released by your instructor after completion of Unit 9. The second project will be released after Unit 11. You must contact your instructor to get the password for each project. The projects must be done individually and the work must be your own. Students may, however, discuss ideas and share course-related information on the discussion forums of the course.

## Student Collaboration

No collaboration is permitted on quizzes and exams. Passwords for exams/projects should not be shared. You may discuss labs/assignments/projects with other students but these discussions should be limited to broad, conceptual questions. You are also allowed to discuss more detailed questions regarding the design and implementation of your programs. However, you are not allowed to share or copy code under any circumstances. For example, it is permitted for one student to ask another student how he/she did something or to ask for help debugging a problem in his/her code; it is not permitted for a student to take another student's code or to let another student write code for him/her. Using the Internet for reference purposes is allowed for assignments but copying code found online is not allowed. Once you have finished the course, sharing your work with future students taking the course is also a violation of the CTYOnline Student Code of Conduct.

## Accommodations for Disabilities

Students may request any accommodations required due to a disability by contacting ctydisabilities@jhu.edu. You can also visit CTY's disability services at http://cty.jhu.edu/ctyonline/about/disability.html for more information.