

NEW YORK CITY COLLEGE OF TECHNOLOGY/CUNY
Computer Systems Technology Department

COURSE: CST1201 – Programming Fundamentals
(2 class hours, 2 lab hours, 3 credits)

Course Description:

This course is an intensive introduction to computer programming using the Java language. Through lectures and lab assignments, students will learn the fundamentals of the Java programming language including control structures and user-defined methods. Concepts of object-oriented-programming will be demonstrated through the introduction of class objects and class inheritance. Students also will learn to create simple Graphic User Interfaces and web applications. Some Java libraries will be introduced in developing application projects, for example, string manipulation classes. Emphasis in the course will be placed on the development, implementation, and execution of projects with an eye to industry standards.

Course Objectives:

Upon successful completion of the course, the student should be able to:

1. Install and run the Java runtime environment
2. Develop, compile, and run Java applications
3. Master control structures in developing applications in the Java programming language
4. Create simple GUI applications
5. Use user-defined functions to implement modular programming techniques
6. Create interactive programs to process data and to create acceptable output
7. Develop programs using data arrays and structures
8. Demonstrate Object Oriented Programming concepts, including composition, and inheritance using the Java programming language
9. Design and implement programs that can be applied to Internet web pages

General Education Outcomes:

- **SKILLS/Inquiry/Analysis:** Students will employ scientific reasoning and logical thinking.
- **SKILLS/Communication:** Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means
- **VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development:** Students will work with teams, including those of diverse composition. Build consensus. Respect and use creativity.

Prerequisites:

CST1100 Introduction to Computer Systems, CST1101 Problem Solving with Computer Programming

Required Materials:

Text: Tony Gaddis, Starting out with Java: Early Objects, 3E, Addison-Wesley, 2007, ISBN-13:9780321497680

Students are required to have a USB storage device for class projects.

Attendance Policy:

Attendance – Attendance is expected at every class meeting. College policy sets the maximum number of permissible absences at 10% of the number of class meetings scheduled for the semester. If the class is meeting two times per week, you are permitted to be absent a total of three class sessions; if the class meets only once per week, you are permitted to miss one and one-half of the class meetings.

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Grading Procedure:

Midterm	30%
Final	30%
Quizzes	10%
Assignments	25%
Class Participation	5%
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TOTAL	100%

Letter Grade	A	A-	B+	B	B-	C+	C	D	F
Numerical Grade	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	70-76.9	60-69.9	<=59.9

Course Outline:

Week	Topics	Reading
1	Introduction to Java Programming Introduction to the Java development environment	Chapter 1

2	<p>Java fundamentals</p> <ul style="list-style-type: none"> - Data types - Operators - Data conversion - String class <p>Dialog box</p>	Chapter 2
3	<p>Classes</p> <ul style="list-style-type: none"> - constructor - class instance - packages 	Chapter 3
4	<p>Control structures – decision</p> <ul style="list-style-type: none"> - if-else –if statements - switch - logical operator - comparing string <p>Random class</p>	Chapter 4
5	<p>Control structure – loop</p> <ul style="list-style-type: none"> - while, do-while and for loop - nested loops <p>introduction to file input/output</p>	Chapter 5
6	<p>Object-Based Programming</p> <ul style="list-style-type: none"> - Writing user defined abstract data types(classes) - Class methods and attributes - Static class methods and attributes - Instance class methods and attributes - Constructors 	Chapter 6.1 – 6.5
7	<p>Object-Oriented Programming</p> <ul style="list-style-type: none"> - passing an object to a method, returning the object, and the ToString Method. <p>Review and Midterm Exam</p>	Chapter 6.6 – 6.11
8	<p>Array and Array List class: Processing an array, and passing and returning an array.</p>	Chapter 7.1 – 7.5
9	<p>Array and Array List class: String array, and Sequential search and binary search.</p>	Chapter 7.6 – 7.9
10	<p>Text processing and wrapper classes: Wrapper class and Character class.</p>	Chapter 8.1 -8.3
11	<p>Text processing and wrapper classes: More about String, StringBuilder and StringTokenizer.</p>	Chapter 8.4 – 8.6
12	<p>Inheritance: Super class constructor and members, and Overriding super class members.</p>	Chapter 9.1 – 9.3
13	<p>Introduction to GUI applications</p>	Chapter 11
14	<p>Applets</p>	Chapter 13.1 – 13.4
15	<p>Review and Final Exam</p>	

Course Assessment criteria:

For the successful completion of this course a student should be able to:	Evaluation methods and criteria
1. Demonstrate understanding of a Java program, and the Java development environment	1. Students will edit, compile, execute and get hard copy of a simple program.
2. Demonstrate understanding of arithmetic operators, logical operators, and relation operators.	2. Students will write a program using the Java arithmetic operators, input/output methods and appropriate manipulators for formatting.
3. Use if and switch selection structure.	3. Students will write program using appropriate selection statements.
4. Use control structures to execute statements in a program repeatedly.	4. Students will write a program using appropriate looping statements.
5. Create new functions and understand how to write functions.	5. Students will write a program using functions.
6. Demonstrate understanding on how to use arrays.	6. Students will use both one dimensional and multi-dimensional arrays. Students will describe different sorting and searching algorithms.
7. Demonstrate understanding on how to manipulate strings.	7. Students will develop application that involve string manipulation using Java classes
8. Demonstrate understanding on how to use the object-oriented principle of inheritance.	7. Students will write programs using inheritance-public, protected, and private access specifiers.
9. Create simple GUI applications.	8. Students will perform an assignment that requires creation of a GUI application.
10. Create a simple applet.	9 Student will complete a project that creates html with an applet.

General Education Outcomes and Assessment:

Learning Outcomes	Assessment Method
SKILLS/Inquiry/Analysis Students will employ scientific reasoning and logical thinking.	<p>Students will describe problem, identify inputs, processes and desired outcomes in laboratory assignments, class work and tests.</p> <p>Students will solve problems with the NetBeans software development tool in laboratory assignments, class work and tests.</p> <p>Students will identify coding paradigms in Laboratory Assignments, Class work and tests</p>

<p>SKILLS/Communication</p> <p>Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means</p>	<p>Students will present their analysis of the Java algorithms in tests and written assignments.</p>
<p>VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development</p> <p>Students will work with teams, including those of diverse composition. Build consensus. Respect and use creativity.</p>	<p>Some lab assignments will involve multiple components carried out by the various team members.</p>

Bibliography

1. Liang, Y. Daniel *Introduction to Java Programming*, Brief Version, 7/e, Prentice Hall, 2008
2. Savitch, Walter and Carrano, Frank M., *Java: Introduction to Problem Solving and Programming*, 5/e, Prentice Hall, 2008
3. Liang, Y Daniel, *Introduction to Java Programming: Comprehensive Version*, 6th. ed. Prentice Hall, 2008
4. Arnold, Ken, James and David Holmes David, *The Java Programming Language* (Fourth Edition), Addison-Wesley, 2005
5. Deitel, Harvey M. and Deitel, Paul J., *Java How to Program* (Sixth Edition), Prentice-Hall, 2004
6. Eckel, Bruce, *Thinking in Java* (Fourth Edition), Prentice-Hall, 2006.
7. Flanagan, David, *Java in a Nutshell* (Fifth Edition), O'Reilly Media, 2005.
8. Flanagan, David, *Java Examples in a Nutshell* (Third Edition), O'Reilly Media, 2004.
9. Lewis, John and Loftus, William, *Java Software Solutions: Foundations of Program Design* (Fifth Edition), Addison-Wesley, 2006.
10. Savitch, Walter and Carrano, Frank M., *Java: An Introduction to Problem Solving and Programming* (Fifth Edition), Prentice-Hall, 2008.
11. Vermeulen, Allan and Ambler, Scott W., et al., *The Elements of Java Style*, SIGS Books (Cambridge University Press), 2000.
12. Wu, C. Thomas, *Introduction to Object-Oriented Programming with Java* (Fourth Edition), McGraw-Hill, 2005.
13. Zakhour, Sharon and Hommel, Scott, et al., *The Java Tutorial: A Short Course on the Basics* (Fourth Edition), Addison-Wesley, 2006.
14. Bloch, Joshua, *Effective Java: Programming Language Guide* (Second edition) Addison – Wesley, 2001