SCHOOL DISTRICT OF THE CHATHAMS
CURRICULUM PROFILE

CONTENT AREA(S): Design & Technology **GRADE LEVEL(S):** 9-12

COURSE: Programming in Java **TIME FRAME:** Semester (2.5 Credits)

PREREQUISITES: Game Design with Python, Robotics & Controls, or previous programming experience and department recommendation.

I. Course Overview

Programming in Java provides an introduction to the Java programming language and can be used as a prerequisite for AP Computer Science A or AP Computer Science Principles. This course will cover the basics of the Java programming language as well as covers general material on the discipline of computer science. Topics include computing devices (hardware and software), the software development process, structured programming, top-down design and programming language features. These features include identifiers, data types, input/output commands, control flow statements, classes, and user-defined methods.

II. Units of Study

Unit 1: Introduction to Eclipse
Unit 2: Conditionally Executing Instructions
Unit 3: Computer Architecture and Java
Unit 4: Outputting to the console, Variables, Data Types, Expressions and Data Conversions
Unit 5: Objects and the String Class
Unit 6: Flow of Control
Unit 7: Arrays, Error Handling and File Manipulation

III. Essential Questions *(The open-ended, provocative questions that help frame inquiry)*

- What is the hierarchical structure of a library?
- How do we import packages/classes?
- What are some packages available in the JSL?
- How do we implement the scanner class?
- How do we implement the random class?
- How do we implement the math class?
- What does 'static' keyword mean?
- How do we implement the decimalformat class?
- If and While revisited
- What are the equality/relational operators?
- What are the logical operators?
- What is short-circuiting?
- How do we use logical operators in conjunction with conditionals to alter flow of control?
- Nesting revisited
- What are the issues with dealing with doubles in java?
- How do we create a tolerance?
- How do we compare char vs comparing Strings?
- How do we implement a switch statement?

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- What do the keywords 'break' and 'default' mean?
- How does a Do statement differ from a While and how do we implement one?
- How do we implement a For statement?
- How do we trace nested For loops?
- How do we determine what kind of loop is most appropriate to use?
- What is the purpose of a Try and how do we implement it?
- How do we access data from a txt file?
- What is PrintWriter and how do we write to a text file?
- What is the meaning of Throws?

IV. Learning Objectives

Objectives align with the New Jersey Student Learning Standards (NJSLS) Standard 8.2 - Strand E. It also incorporates concepts of problem solving in Mathematics and the content areas of Technological Literacy and 21st Century Life and Careers.

V. Instructional Materials

Java Software Solutions, foundations of program design, 6th Edition, by John Lewis, William Loftus, and Cara Cocking, Addison Wesley.

Supplementary Materials

- Online documentation for the Java programming language
- Online documentation for the Eclipse IDE
- Software for development for applets (JoeApplet, SolidObject class), etc.
- Teacher Generated Materials

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- Online documentation for the Java programming language
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- Software for development for Karel (karel.jar), etc.
- Teacher Generated Materials

VI. Key Performance and Benchmark Tasks

- Understand the structure of a Library.
- Understand the function of the Scanner class and methods available.
- Understand the function of the Random class and methods available.
- Understand the function of the Math class and methods available.
- Distinguish between static and non-static methods.
- Understand the function of the DecimalFormat class and methods available.
- Write programs which implement the aforementioned classes.
- Revisit the concept of If and While, singularly and nested.
- Understand the various equality, relational and logical operators.
- Understand what short-circuiting is and how to apply it.
- Understanding how to alter flow of control.
- Revisit comparisons and issues (binary representation and comparing doubles in java, comparing char vs Strings).
- Understand how a switch statement functions.
- Recognizing key words 'break' and 'default'

- Write programs implementing boolean logic and switch statements.
- Understand the difference between a While, Do and For loop.
- Understand the structure of a For loop.
- Navigate the flow of nested For loops.
- Understand the purpose and function of Try/Catch
- Introduce reading from and writing to a text file
- Introduce the concept of Throws
- Write programs implementing For loops, reading to and writing from text files.
- Understand the difference between a While, Do and For loop.
- Understand the structure of a For loop.
- Navigate the flow of nested For loops.
- Understand the purpose and function of Try/Catch
- Introduce reading from and writing to a text file
- Introduce the concept of Throws
- Write programs implementing For loops, reading to and writing from text files.
- Design and implement a java applet/application referencing the techniques learned.
- Work in a team to develop a console (or other) application to solve a real world problem.