

1. Course number and name

CptS 131: Program Design and Development Java

2. Credits and contact hours

4 credits, 3 lecture hours, 3 lab hours

3. Instructor's or course coordinator's name

Kyle Doty

4. Textbook, title, author, and year

R. Lysecky and A. Lizarraga. 2018, *Java Early Objects* (5th ed.). Zyante Inc. (zyBooks.com). ISBN: 978-1-5418-2234-4.

Other supplemental materials

W. Savitch. 2014. *Java: An Introduction to Problem Solving and Programming Student Value Edition* (7th ed.). Pearson. ISBN-13: 978-0133841084.

5. Specific course information

- a. *Catalog description:* Formulation of problems and top-down design of programs in a modern structured language for their solution on a digital computer. Taught in Java programming language.
- b. *Prerequisites or corequisites:* MATH 108, 171, 172, 182, 201, 202, 206, or 220, each with a C or better, or ALEKS math placement score of 80% or higher, or adequate CPT S placement test score determined by the department.

6. Specific goals for the course

By the end of the course, students will be able to

- Design, implement, and test a program by applying modern tools and techniques (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
- Analyze a specification of a problem of modern complexity and construct a structured, elegant Java program that solves the problem (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
- Document Java programs applying the guidelines specified in a standards and styles guide including Javadoc comments (3a, 3b)
- Identify and implement test cases to edge scenarios in pseudocode and/or Java code (6b, 6d).
- Identify, analyze, and solve Java code interview questions in prep for internships (1a, 1b, 1c, 1d, 1e).

7. Brief list of topics to be covered

- Introduction to Algorithms
- Software Development Process
- Variables, Data Types, and Operators
- Numeric Expressions
- Methods (Java class libraries and user-defined)
- Classes and Objects

- Constructor methods
- Fields
- Inheritance
- Polymorphism
- Abstract Classes and Methods
- Interfaces
- Generics
- java.awt.Graphics Class
- Event Handling
- File Processing
- Selection Structures
- Loops (loop patterns)
- Modular Programming
- Arrays
- Strings
- Collections
- Recursion
- Dynamic Data Structures
- Command Line Arguments
- Testing and Debugging
- Macros
- Multi-file Programs
- Problem Solving with Algorithms
- Pseudocode
- Software Design and Engineering Concepts
- Problem Solving Strategies