1. **Course number and name**
   CptS 132: Data Structures 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**

5. **Specific course information**
   a. **Catalog description:** Advanced programming techniques: data structures, recursion, sorting and searching, and basics of algorithm analysis. Taught in Java programming language.
   b. **Prerequisites or corequisites:** CPT S 131 with a C or better.

6. **Specific goals for the course**
   By the end of the course, students will be able to
   - Design, apply, and implement data structures including lists, stacks, queues, and binary trees (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
   - Apply and implement several sorting algorithms (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
   - Analyze algorithmic complexity (6c).
   - Design, implement, and test Java programs applying modern tools and techniques (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
   - Analyze a specification of a problem of moderate complexity, and construct a structured, elegant Java program that solves the problem with the most appropriate data structure(s) (1a, 1b, 1d, 1e, 6a, 6b, 7b, 7c, 7d, 7f, 7g).
   - Design and articulate solutions to lab problems (1a, 1b, 1d, 1e, 3a, 3b).
   - Identify and implement test cases to edge scenarios in pseudocode and/or Java code (6b, 6d).
   - Identify, analyze, and solve Java code and data structures interview questions in prep for internships (1a, 1b, 1c, 1d, 1e).

7. **Brief list of topics to be covered**
   - Data Structures
   - Linked Lists
   - Stacks
   - Queues
   - Binary Search Trees
   - Recursion
- Software Design and Engineering Concepts
- Problem Solving Strategies
- Classes and Objects
- Inner Classes
- Generic Classes
- Operator Overloading
- Function Overloading
- Algorithmic Analysis (Big-O)
- Abstract Data types
- Inheritance
- Sorting Algorithms
- Polymorphism
- Intro to Graphics
- Exception Handling
- Java Class Libraries
- Packages
- Jar files
- JUnit
- Heaps
- Hashing