
CSE 143 Computer Programming II

Credits

5.0 (3 hrs lecture, 2 hrs section)

Lead Instructor

Stuart Reges

Textbook

- *Building Java Programs*, Reges

Course Description

Continuation of CSE 142. Concepts of data abstraction and encapsulation including stacks, queues, linked lists, binary trees, recursion, instruction to complexity and use of predefined collection classes.

Prerequisites

CSE 142.

CE Major Status

Required

Course Objectives

Students learn about data abstraction and the basic design principles of object oriented programming. Students will become familiar with standard data abstractions (lists, maps, sets, stacks, queues) as well as a variety of implementation techniques (arrays, linked lists, binary trees). Students will learn to program using recursion and recursive backtracking. Students will learn the object-oriented constructs that support code reuse (encapsulation, interfaces, inheritance, abstract classes) as well as learning how to make use of off-the-shelf components from libraries like the Java Collections Framework.

ABET Outcomes

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (e) an ability to identify, formulate, and solve engineering problems
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Topics

- Abstract data types: stacks, queues, lists, maps, sets

- Implementing linked structures (linked lists, binary trees)
- Recursion and recursive backtracking
- Using off-the-shelf components (e.g., Java Collections Framework)
- Use of inheritance for additive change and factoring out common code into abstract classes
- Class design: encapsulation, documentation, throwing exceptions, appropriate choice of fields
- Thorough testing and debugging
- Time and space complexity
- Efficient sorting and searching algorithms (binary search, mergesort)
- Iterator use and implementation