

**CISC 3130 Course Syllabus and Homework Assignments**  
**Text: Starting Out With Java From Control Structures through Data Structures, 4<sup>th</sup> ed.**  
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Introduction: Course Overview & Review

- Inheritance
- Polymorphism
- Abstract Classes and Abstract Methods
- Interfaces
- Exception Handling
- Recursion

**[HW0: Programming Assignment #0 \(Bank Accounts\)](#)**

Chapter 16: Sorting, Searching, and Algorithm Analysis

- Review of Sorting Algorithms
  - the selection sort
  - the bubble sort
  - the insertion sort
  - the quicksort algorithm
- Review of Search Algorithms
  - the sequential search algorithm
  - the binary search algorithm
  - a recursive binary search
- Analysis of Algorithms
  - complexity of algorithms
  - worst case and average case analysis
  - Big O Notation

**[HW16: Programming Assignment #1 \(Sorting and Searching\)](#)**

Chapter 17: Generics

- Introduction to Generics
- Writing a Generic Class
- Passing Objects of a Generic Class to a Method
- Writing Generic Methods
- Constraining a Type Parameter in a Generic Class
- Inheritance and Generic Classes
- Defining Multiple Type Parameters
- Generics and Interfaces
- Erasure
- Restrictions on the use of Generic Types

**[HW17: Programming Assignment #2 \(Generics\)](#)**

Chapter 18: Collections and the Stream API

- Introduction to the Java Collections Framework
- Lists
- Sets
- Hashing Algorithms
- Maps
- The Collection Class
- The Stream API

**[HW18: Programming Assignment #3 \(Collections\)](#)**

**Examination #1:**

## Chapter 19: Linked Lists

- Introduction to Linked Lists
- Operations on Linked Lists
- Doubly Linked and Circularly Linked Lists
- Recursion on Linked Lists

**[HW19: Programming Assignment #4 \(Linked Lists\)](#)**

## Chapter 20: Stacks and Queues

- Stacks and Their Applications
- Array Implementation of Stacks
- Linked List Implementation of Stacks
- Queues and Their Applications
- Array Implementation of Queues
- Linked List Implementation of Queues
- Generic Implementation of Stacks and Queues
- Queues and Breadth-First Search

**[HW20: Programming Assignment #5 \(StacksAndQueues\)](#)**

## **Examination #2:**

## Chapter 21: Binary Trees, AVL Trees, and Priority Queues

- Binary Trees and Their Applications
- Binary Search Trees
- AVL Trees
- Priority Queues

**[HW21: Programming Assignment #6 \(Complete Binary Tree - Heap Order Priority\)](#)**

## **Final Examination**