

CS 221 – Data Structures

Credit Hours: 4

Scheduled hours per week

Lecture: 3

Lab: 1

Other:

Catalog Course Description: The conceptualization and usage of software data structures and abstract data types to solve complex problems. Topics include using standard libraries to develop complex software and analyze algorithms for efficiency and performance.

Pre-requisites: CS 122 must be passed with a grade of “C” or better

Co-requisites:

Course Learning Outcomes:

Students should have an understanding of and be able to apply the following concepts:

- Relationships between data
- Algorithm design
- Abstract data types such as stacks, queues, collections, and trees to solve problems
- Analysis of run time and memory usage/performance cost of various algorithms
- Sorting and searching data efficiently
- Graph and network algorithms
- Students should be able to design and code programs to solve complex problems using standard library data structures

Topics to be studied:

<ul style="list-style-type: none"> ● Recursion ● Data Abstraction ● Linked Lists ● Abstract Data Types ● Stacks 	<ul style="list-style-type: none"> ● Queues ● Advanced Java Topics ● Algorithm Efficiency and Sorting ● Trees ● Tables
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Relationship of Course to Program or Discipline Learning Outcomes:

Computer Science

✓	Ability to understand and use elements of good programming style and best practices
✓	Understanding of programming paradigms, such as imperative, functional, and object oriented design
✓	Ability to understand and use variables with different data types and control structures
✓	Ability to perform top-down design, use modular programming, string processing, elementary data structures, basic disk I/O, and recursion
✓	Ability to use data structures and algorithms to represent data relationships, data manipulation, searching, sorting, and solving complex problems
✓	Ability to design, configure, troubleshoot, and manage database tables, normalize data, and store and retrieve object attributes in a database

For general education courses, a listing of the general education competencies that are met.)

Relationship of Course to General Education Learning Outcomes:	
Composition and Rhetoric Students illustrate a fundamental understanding of the best practices of communicating in English and meet the writing standards of their college or program-based communication requirements.	✓
Science & Technology Students successfully apply systematic methods of analysis to the natural and physical world, understand scientific knowledge as empirical, and refer to data as a basis for conclusions.	✓
Mathematics & Quantitative Skills Students effectively use quantitative techniques and the practical application of numerical, symbolic, or spatial concepts.	✓
Society, Diversity, & Connections Students demonstrate understanding of and a logical ability to successfully analyze human behavior, societal and political organization, or communication.	
Human Inquiry & the Past Students interpret historical events or philosophical perspectives by identifying patterns, applying analytical reasoning, employing methods of critical inquiry, or expanding problem-solving skills.	
The Arts & Creativity Students successfully articulate and apply methods and principles of critical and creative inquiry to the production or analysis of works of art.	✓
5/3/2016	

Special requirements of the course:

You will need a computer with an Internet connection

Additional information:

Prepared by: Gary Thompson

Date: 10/20/2017