

COURSE OUTLINE OF RECORD

Dept., Number	CSC 3371	Course Title	Applied Data Structures
Semester Hours	3		
Year	2006	URL (if any):	

Current Catalog Description:

This course emphasizes data structures and the development and analysis of their associated algorithms. Specific data structures include linear lists, arrays, trees, graphs, stacks, queues, and tables. Pointer variables and recursion will be used. Applications will include searching and sorting. Prerequisite: Admission to the Certificate Program and CSC 3361.

Textbook:

Data Structures with JAVA by William Ford, William Topp, Prentice Hall, 2005

Course Goals:

1. To introduce varied data structures and algorithms.
2. To analyze the efficiency of algorithms.

Prerequisites by Topic:

1. Proficiency in writing Java programs
2. Experience with elementary searching and sorting algorithms.

Major Topics Covered in the Course (number of weeks):

1. Classes (5)
2. Algorithms – Introduction and Sorting (4)
3. Recursion (2)
4. Collection Types, Linked Lists (4)
5. Iterators (3)
6. Stacks (3)
7. Queues and priority queues (3)
8. Binary trees (3)
9. Graphs (3)

Laboratory Projects:

1. A programs on classes (1 week)
2. A program that involves sorting.(1 week)
3. A program involving stacks and/or queues. (1 week)
5. A program involving a binary tree (1 week)

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms	1		Data Structures	2	
Software Design			Prog. Languages		
Comp. Arch.					

Oral and Written Communication:

Typically, every student is required to submit at least 1 written report (not including exams, tests, quizzes, or commented programs) of 2-3 pages and to make 0 oral presentations. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

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Social and Ethical Issues:

Students write one paper on a computer ethics topic that is somewhat related to software. Usually the paper requires analysis of a controversial issue. Class time spent on it is limited to 20-30 minutes of explanation of the assignment. The paper is graded for content and style, but there are no exam questions relating to it.

Theoretical Content:

The theory of information hiding permeates all the data structures in the course, although not much class time is spent on it directly. There is an introduction to big-O notation (1 hour).

Problem Analysis:

The course analyzes the data in the abstract data structures, the actions taken on that data, and the common applications of the data structures. It also does running time analysis of implementations of data structures.

Some analysis issues arise because the students see many different data structures and more than one implementation of some of them: Which data structure is appropriate for a given application? Which implementation is the best for a given data structure?

The ethics paper usually involves analysis of a controversial topic.

Open-Ended Design:

Students study the designs of various implementations of data structures and the design of some programs that use the data structures.