CSE250: DATA STRUCTURES (4 Credits, Required)

Catalog Description
Provides a rigorous analysis of the design, implementation, and properties of advanced data structures. Topics include order notation and time-space analysis and tradeoffs in a list, tree and graph algorithms, and hashing. Surveys library implementations of basic data structures in a high-level language. Advanced data structure implementations are studied in detail. Illustrates the importance of choosing appropriate data structures when solving a problem by programming projects in a high-level language different from the language of CSE115 and CSE116; also covers instruction in this language.

Prerequisites
Prerequisites: CSE116, CSE191
Corequisites: None

Textbooks(s) and/or other required material
Mark Allen Weiss. (2006). Data Structures and Algorithm Analysis in C++, third edition, Addison Wesley. (ISBN: 032144146X)

Mark Allen Weiss. (2004). C++ for Java Programmers, Prentice Hall. (ISBN: 013919424X)

Course Objectives
At the end of this course you should be able to perform basic analysis of algorithms, understand how various data structures and algorithms function, be able to implement them in a high-level language, and be able to pick an appropriate data structure or algorithm for a given task.

Topics Covered
C++ (syntax review, OO review, templates, namespaces, pointers, make files, debuggers)
Asymptotic notations, properties
Lists, stacks, queues, deques (STL and analysis)
Trees (e.g. AVL, Red-black, Splay, 2-3, trie)
Priority queues (e.g. binomial, skew, leftist)
Hash tables/hashing
Graphs (representations, traversals)

Class / Lab Schedule
Three 50-minute lectures per week
One 50-minute recitation per week

Contribution of course to professional component/criterion 5
Engineering Topics: 4 credits

Relationship of course to program outcomes

This course is required of all computer engineering students and has a significant relationship with the following program objectives for computer engineering:

(e) An ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principles.

(k) An ability to use the techniques, skills, and modern hardware and software engineering tools necessary for computer engineering practice.

This course has a strong relationship with the following program objectives for computer engineering:

(a) An ability to apply knowledge of mathematics, probability & statistics, computer science, and electrical engineering as it applies to the fields of computer software and hardware

(b) An ability to design and conduct experiments, as well as to organize, analyze, and interpret data.

(f) An understanding of professional, legal, and ethical issues and responsibilities as it pertains to computer engineering.

Persons who prepared this description and date of preparation
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