

DS01 - Course Objectives

Catalog Description

Abstract data structures, algorithm analysis, strings, lists, trees, binary search trees, priority queues, hashing, graphs, object oriented programming

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. In addition, another objective of the course is to develop effective software engineering practice, emphasizing such principles as decomposition, procedural abstraction, and software reuse.

Prerequisites

CIS 252

Course Outcomes

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
[ABET (a, c)]
- Demonstrate different methods for traversing trees [ABET (a)].
- Compare alternative implementations of data structures with respect to performance [ABET (a, b, c)].
- Compare and contrast the benefits of dynamic and static data structures implementations [ABET (a, b, c)].
- Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack [ABET (a, c)].

- Design and implement an appropriate hashing function for an application [ABET (a, b, c)].
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing [ABET (a, b, c)].

Outcome Measurement

Based on about ten to eleven formal laboratory assignments, midterm and final exams.

Course Topics

Basic Java and programming methodology, basic data structures (stacks, queues, linked lists, double ended queues, binary trees, general trees, priority queues, heaps, binary search trees, hash tables, asymptotic analysis of simple loops and structures.

CAC Category Content

1.5 Data Structures

1.5 Algorithms

0.5 Software Design

0.0 Computer Organization & Architecture

0.5 Programming Languages