

Syllabus

Course

Code: *CSC220*
Title: *Data Structures and Algorithms*

Credits

3-0-2-3

Text Books

- Michael McMillan. Data Structures and Algorithms Using C#, 2007, Cambridge University Press, New York.

References

- Robert L. Kruse and Alexander J. Ryba . Data Structures and Program Design in C++, Prentice Hall, 1999.
- Collins. Data Structures and the Java Collections Framework, McGraw-Hill, 2002.

Prerequisite:

CSC102

Course Description

The course will teach some powerful ideas that are central to quality software: data abstraction and recursion. Contents include: both external "interface" view, and internal "implementation" details, for commonly used data structures, including lists, stacks, queues, priority queues, search trees, hash tables, and graphs. This unit covers the way information is represented in each structure, algorithms for manipulating the structure.

Objectives:

- Understand the theory, algorithm and design of algorithmic solutions.
- State big O notation memory usage and running times associated with the developed algorithms.
- Use appropriate data structure such as stack, queue, binary tree, or graph required to solve a problem.
- Be familiar with a number of important computer algorithms using those structures
- Apply data structure knowledge in implementing advanced programs.

Course Outline

<i>Week</i>	Topics
1	Introduction
2	Generic-BigO
3	Arrays
4	Array Lists
5	Sort Algorithms
6	Sort Algorithms Advanced
7	Search Algorithms
8	Stacks – Static
9	Queue - Static
10	Linked Lists
11	Stacks – Dynamic
12	Queue - Dynamic
13	Graphs and Search Techniques
14	Tree and Search Techniques
15	Course Review
16	Final Exam

Grading

Assessment/Evaluation:

Midterm 1	15%
Midterm 2	15%
Assignments	20%
Quizzes	10%
Final Exam	40%
Total	(100%)

Intended Learning Outcomes:

Upon completion, students will be able to:

Outcomes	Assessment Methods
Examine the most important data structures in use in computers today	Exams Quizez Assignments
Understanding of time complexity	Exams Quizez Assignments
Understand the algorithms that efficiently use those data structures	Exams Quizez Assignments
Reinforce and extend the understanding and programming of the used programming language.	Exams Quizez Assignments

Method of Teaching:

- **Lectures (three hours per week)**
- **Tutorial (two hours per week)**