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Department of Computer Engineering	
Data Structure and Algorithms (66211)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Computer Programming (66111)

Course Contents

Introduction to object oriented programming in C++, Basic data structures: stacks, queues, trees, binary trees, balanced search trees, Graphs, hash tables and hash functions, list representation and string representation.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	Demonstrate an understanding of object oriented programming concepts (class, inheritance, templates, functions and operators overloading) and how they are supported by C++ language.	A	10 %
2	Describe the usage of various data structures and explain the operations for maintaining common data structures.	C	70 %
3	Design and apply appropriate data structures for solving computing problems and recognize the associated algorithms and complexity	E	20 %

Textbook and/ or Refrences

Data Structures Using C++, 2nd edition , D.S. Malik , Data Structure and Program Design in C++, Robert L. Kruse and Alexander J. Ryba.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Homeworks	10 %
Projects	10 %
Final Exam	40 %

Course Plan

Week	Topic
1- 3	Introduction (C review, Structures, File Processing, C++ features such as: overloading and Inline functions, C++ classes: constructors, destructor, and operator overloading, Inheritance, Templates).
4	Linked Lists (Operations on lists, Doubly linked lists, Circular lists).
5- 6	Stacks (Definition and operations, Stack specifications, Implementation of stack as an array, Implementation of stack as a linked list)
7	First exam
7	Queues (Definition and operations, Implementation of queues, Circular implementation of queues in C++, Linked Queues).
8- 9	Trees (General trees, Binary trees, Binary search trees., Implementation of trees, Balanced search trees)
10- 11	Tables and information retrieval (Shapes of tables., Direct address tables, Hash tables , Hash functions, Collision resolution, Analysis of hashing, Universal and perfect hashing)
10	Second exam
12-	Graphs (Definitions and examples, Undirected graphs, Directed graphs, Computer

13	representations, Graph Traversal, Shortest Paths, Minimum Spanning Trees).
14-16	List Representation (Contiguous representation, Linked representation, Strings)
14-16	Introduction to complexity analysis (Average case analysis, Worst case analysis, Memory usage,Sorting and searching examples).
16	Final exam