

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE

Course Code: BIT 222

Course Title: Data Structures and Algorithms

Purpose

This course unit is designed to focus on implementation and mathematical analysis of fundamental data structures and algorithms. It covers storage allocation and memory management techniques.

Objective

- To appreciate how computing systems may be implemented using data structures.
- To appreciate application of data structures in solutions to common computing requirements.

WEEK 1

- Introduction to object technology; data Abstraction, Inheritance, Polymorphism, classes, objects.

WEEK 2

Basic Data structures

- Arrays: Array implementation; Application (RPN Usage in Web browsers, Word editors, Method call management)
- List data structure-Linked Lists: implementation; Application

WEEK 3

Non linear Structures

- Trees-Binary Trees: Array implementation, linked list implementation

Assignment 1

WEEK 4

- Binary Search trees: Tree traversals
- Binary heaps

WEEK 5

Abstract data types

- Stacks: implementation; Application

CAT 1

WEEK 6

- Queues: Implementation;
- The set data structure

WEEK 7

- Priority queues.

Introduction to Graphs

WEEK 8

- Practice on graph theory

Assignment 2

WEEK 9

Application of Huffman codes;

- Overview of area of application

WEEK 10

Searching Algorithms

- Sequential/Linear search
- Binary search

CAT 2

WEEK 11

Sorting algorithms:

- Bubble sort;
- Heap sort
- Selection sort

WEEK 12

Recap of the data structures concepts

Revision of CATs and Assignments

Assessment:

- Assignments, Practical Exercises.....15%
- CATs----- 15 %
- Written / main Examinations----- 70 %

Reference

- Anany Levitin - Introduction to The Design and Analysis of Algorithms
- Data structures with Java, John R. Hubbard, c. 2004
- Absolute Java, Walter Savitch, 3rd Edition
- Jon Kleiberg – Algorithm Design

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Consultation Time: Tuesday- 8.00-10.00 Hours & Wednesday – 8.00- 10.00 Hours

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