

**MOI UNIVERSITY**  
**SCHOOL OF INFORMATION SCIENCES**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**COURSE OUTLINE**

Unit Code:	<i>INF 228</i>
Unit Title:	<b>DATA STRUCTURES AND ALGORITHMS I</b>
Lecturer Name:	<i>Faith Kibas</i>
Lecturer Contacts:	<a href="mailto:faykibas@gmail.com">faykibas@gmail.com</a> <i>0728 669313</i>
Class time	Mondays 12 PM – 2 PM

**JUN - AUG 2021**

**UNIT PURPOSE/DESCRIPTION**

This course is designed to introduce students to data structures and algorithms along with their respective applications.

**EXPECTED LEARNING OUTCOMES**

By the end of the course unit the student should be able to:-

- Describe the various ways of organizing data
- Apply basic knowledge and skills to develop basic algorithms
- Select and apply relevant data structures for specific problems in programming
- Demonstrate an understanding of basic data structures necessary for advanced study

**Pre-requisite:**            INF 100: Introduction to Informatics  
                                  INF 106: Discrete Mathematics for Informaticists

## **COURSE DESCRIPTION**

<b>Week</b>	<b>Topic</b>	<b>Sub-topic</b>
<b>Week1: TOPIC 1</b>	<b>Introduction</b>	Definitions; primitive data types; compound data types
<b>Week 2: TOPIC 2</b>	<b>Linear data structures</b>	Arrays-single: multi-dimensional
<b>Week 3: TOPIC 2</b>	<b>Linear data structures</b>	Queues and stacks
<b>Week 4: TOPIC 3</b>	<b>Non-linear data structures</b>	Binary trees, ego binary search trees depth first; breadth first search trees.
<b>Week 5: TOPIC 3</b>	<b>Non-linear data structures</b>	Representation and manipulation of sets; graphs
<b>Week 6</b>	<b>CAT 1</b>	Writing Continuous Assessment Test 1
<b>Week 7: TOPIC 3</b>	<b>Non-linear data structures</b>	Depth first; breadth first search trees. Priority queues and heaps
<b>Week 8: TOPIC 4</b>	<b>Sorting</b>	Ego selection
<b>Week 9: TOPIC 4</b>	<b>Sorting</b>	Merge
<b>Week 10: TOPIC 4</b>	<b>Sorting</b>	Quick sorts
		Assignment
<b>Week 12: TOPIC 4</b>	<b>Sorting</b>	Bubble sort
<b>Week 13: TOPIC 5</b>	<b>Future Trends</b>	Current and emerging issues in data structures and algorithms
<b>Week 14:</b>		<b>FINAL EXAMINATION</b>

### **Teaching/learning methodology**

This is a practical course and delivery will utilize a variety of learning strategies to accomplish an understanding and mastery of the learning outcomes and concepts presented. These include, but not limited to, reading assignments, lectures and seminars, case studies, term paper, journal article

reviews, essays, critical thinking and analysis of the subject matter and examinations. The delivery emphasis is on reasoning, understanding and application of knowledge and skills rather than memorizing. This is a theory course and delivery shall be by lectures and seminars

### **Other Instructional materials/Equipment :**

Textbooks, Journals, Case studies, Government/Institutional reports.

### **COURSE ASSES MENT**

<i>Assessment Type</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Assignment: Article summaries/library search</i> 10%	<i>1</i>	<i>10%</i>
<i>CATs 1. WRITTEN PAPER</i> 30%	<i>1</i>	<i>30%</i>
<i>Final Examination</i>	<i>1</i>	<i>60%</i>
<i>Total</i>		<i>100%</i>

### **Course Texts**

#### Course Texts and References

1. Salmon (1994). Structures and abstraction : a brief introduction to Turbo pascal. richard Irwin Inc. Newyork.
2. H. Cormen, C. E. Leiserson and R. L. Rivest, *Introduction to Algorithms*, Tata-Mcgraw Hill Publishers.
3. A. Aho, J. E. Hopcroft and J. D. Ullman, *Data Structures and Algorithms*, Addison-Wesley.
4. Horowitz and Sahani, *Fundamentals of Data Structures in C/C++*, Computer Science Press.
5. A. Aho, J. E. Hopcroft and J. D. Ullman, *Design and Analysis of Computer Algorithms*, Addison-Wesley.
6. John R A (2007). An introduction to Java programming and object oriented development. Thomson course Technology. USA
7. Deitel P ,Deitel ,H and Deitel A (2013). Android :How to program with an introduction to java. PEARSON. Education limited. USA
8. Dietel H and Dietel P (2013). C++ how to program .PERASON horizon Edn Malaysia.

### **Course Journals**

1. Springer Journals