# IT1312 Data Structures & Algorithms

LEARNING UNIT (LU) INTRODUCTION

(AY2024 S2)

# LU Lecturer & Tutors

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# LU Synopsis

With the increased complexity and data volume of enterprise-level applications, <span style="color:red">**appropriate data structures**</span> and <span style="color:red">**efficient algorithms**</span> are essential in <u>business application development</u>. Through this competency unit, learners will develop competencies in manipulating <span style="color:red">**arrays**</span>, <span style="color:red">**lists**</span>, <span style="color:red">**dictionaries**</span>, <span style="color:red">**stacks**</span>, <span style="color:red">**queues**</span> and other dynamic data structures. Learners will learn how to use <span style="color:red">**searching and sorting algorithms**</span> for effective problem-solving. The algorithmic competencies include <span style="color:red">**linear search**</span> and <span style="color:red">**binary search**</span> algorithms with and without using <span style="color:red">**recursion**</span>, <span style="color:red">**bubble**</span>, <span style="color:red">**insertion**</span>, <span style="color:red">**selection**</span>, <span style="color:red">**merge**</span>, <span style="color:red">**quicksort**</span> and other sorting algorithms.

# LU Learning Outcomes

Upon successful completion of this LU, students will be able to:

1. Use static and dynamic data structures to abstract data representation for efficient software design.

2. Select appropriate sorting & searching algorithms to improve computational efficiency in solving business problems.

3. Use multi-dimensional data structures in solving complex computational problems.

4. Mentor peers in creating computer programs using data structures and algorithms.

# LU Learning Content

| | | |
|---|---|---|
| **Topic 1** Python Overview | **Topic 2** Introduction to Algorithms | |
| **Topic 3** Search | **Topic 4** Sort | **Topic 5** Recursion | **Topic 6** Advanced Sort |
| **Topic 7** Array-based Sequences | **Topic 8** Stacks | **Topic 9** Queues | **Topic 10** Linked List |

# LU Assessment Plan

| Week No. | Assessment | Topic | Weightage |
|---|---|---|---|
| 05 | Brightspace Non-Proctored Quiz | 2 – 4 | 15% |
| 09 | Practical Test | 2 – 5 | 30% |
| 16 | Programming Assignment | | 20% |
| 18 | Written Test | 5 - 9 | 35% |
| | | | 100% |