

# MTH251 Data Structures and Algorithms I

**Level:** 2

**Credit Units:** 5 Credit Units

**Language:** ENGLISH

**Presentation Pattern:** EVERY JAN

## **Synopsis:**

MTH251 will provide students with an understanding of the common algorithms and data structures used in information technology. The topics covered are of central importance for many applications in data analytics and information technology. The course gives a comprehensive introduction to algorithm analysis, basic data types such as stacks, queues and trees and how these data types are implemented with linked lists. Codes will be written and presented in Python.

## **Topics:**

- Algorithm Analysis
- Asymptotic Analysis
- Analysing Recursive Algorithms
- Designing Recursive Algorithms
- Array-Based Sequences
- Multidimensional Data Sets
- Stacks
- Queues
- Linked Lists
- Positional Lists
- Trees
- Tree Traversal Algorithms

## **Textbooks:**

Michael T. Goodrich & Roberto Tamassia.: Data Structures and Algorithms in Python (eTextbook)  
Paperback Edition John Wiley  
ISBN-13: 9781118549582

**Learning Outcome:**

- Describe and implement basic data structures in Python.
- Discuss the advantages and disadvantages of basic data structures.
- Analyze the efficiency and complexity of different algorithms.
- Interpret given algorithms and identify errors in program codes.
- Solve problems using recursive algorithms.
- Implement appropriate data structures codes to store and process information.

**Assessment Strategies (Evening Class):**

<b>Components</b>	<b>Description</b>	<b>Weightage Allocation (%)</b>
Overall Continuous Assessment	TUTOR-MARKED ASSIGNMENT 1	10
	TUTOR-MARKED ASSIGNMENT 2	10
	TUTOR-MARKED ASSIGNMENT 3	10
Overall Examinable Components	Written Exam	70
<b>Total</b>		<b>100</b>