

# TKU211231

Algorithms and Data Structure  
Struktur Data dan Algoritma

## BASIC INFORMATION

<b>Course Credit</b>	3 / 150 minutes per Week
<b>Course Type</b>	Required
<b>Course Classification</b>	Engineering Topics
<b>Prerequisites</b>	Discrete Mathematics; Single-Variable Calculus

## STUDENT AND LEARNING OUTCOMES

### Covered Student Outcomes

Fundamental and Engineering Knowledge (a)      Development of Engineering Solution (b)  
Engineering Design (c)

### Learning Outcomes

- LO1** Students can understand and explain the initial overview of algorithm's requirements and complexity, and data structures.
- LO2** Students can explain and implement Abstract Data Type (ADT) i.e. stack, queue, list, data tree, graph data structures.
- LO3** Students can elaborate and implement various algorithm on data sorting, searching, and graph data structure.

## COURSE DESCRIPTION

This course will discuss about fundamental of algorithm analysis and data structure in programming including searching algorithm, sorting algorithm.

## TOPICS

### 1. Fundamentals

- 1.1 Basic Programming Model
- 1.2 Data Abstraction
- 1.3 Bags, Queues, and Stacks
- 1.4 Analysis of Algorithms

## **2. Sorting**

- 2.1 Elementary Sorts
- 2.2 Mergesort
- 2.3 Quicksort
- 2.4 Priority Queues
- 2.5 Application of Sorting

## **3. Searching**

- 3.1 Sequential and Binary Search
- 3.2 Binary Search Trees
- 3.3 Balanced Search Trees
- 3.4 Hash Tables
- 3.5 Application of Searching

## **4. Strings**

- 4.1 String Sorts
- 4.2 Tries
- 4.3 Substring Search
- 4.4 Regular Expression
- 4.5 Data Compression

## **REFERENCES**

- [1] Sedgewick, R., Wayne, K. (2011). Algorithms, 4th Edition.. Addison-Wesley. ISBN: 978-0-321-57351-3
- [2] Cormen, T. H., & Cormen, T. H. (2001). Introduction to algorithms. Cambridge, Mass: MIT Press.

