

## Course Descriptions None 2024-2025

Course Title Data Structures and Algorithms  
Course Code KEN1420  
ECTS Credits 5,0  
Assessment Whole/Half Grades

Period	Start	End	Mon	Tue	Wed	Thu	Fri
4	3-2-2025	30-3-2025					

Level no level

Coordinator Tom Pepels For more information:tom.pepels@maastrichtuniversity.nl

Language of instruction English

Goals

- \* Knowledge and understanding: Students are able to give examples of data structures and explain do they support program design. Students are able to name what types of standard data structures exist and illustrate their properties. Students are able to describe some standard algorithms and highlight their properties. Students are able to illustrate how to develop and analyze new algorithms.
- \* Applying knowledge and understanding: Students are able to select the appropriate data structure for a given problem and students are able to propose an algorithm for solving a given problem
- \* Making Judgements: Students are able to justify if and determine how data structures are applied. Furthermore, students are able to assess whether algorithms are appropriate and efficient.
- \* Communication: Students are able to explain how data structures and algorithms are to be included in program designs.
- \* Learning Skills: Students are able to reflect on which data structures and/or algorithms are applicable for each problem.

Description

As a continuation of the courses Computer Science 1 and 2, this course will treat the systematic design and application of data structures and algorithms. Data structures such as lists, trees, graphs, and dictionaries, the associated algorithms and their complexity are explored in this course. Algorithms for applications such as sorting, pattern matching and graph traversal are also part of the course. Furthermore, design principles for algorithms such as recursion, divide-and-conquer and dynamic programming will be treated as well. Furthermore, students will develop skills to analyse the run-time and space complexity of data structures and algorithms.

Literature

Study material:  
\* Sedgewick and Wayne (2011) Algorithms Fourth Edition. Addison Wesley. ISBN: 978-0321573513  
Additional or recommended literature:  
\* A Y Bhargava (2016). Grokking Algorithms: An Illustrated Guide for Programmers and Other Curious People. Manning. ISBN: 978-1617292231

Prerequisites

Keywords

Teaching methods Lecture

Assessment methods Written Exam

Evaluation in previous academic year For the complete evaluation of this course please click <http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM>

This course belongs to the following programme / specialisation