TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

Module Handbook

TUK MODHB Homepage

Module INF-82-54-M-2

Algorithms and Data Structures (M, 8.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
INF-82-54-M-2	*Algorithms and Data Structures*	8.0 CP (240 h)

Basedata

CP, Effort	8.0 CP = 240 h
Position of the semester	1 Sem. in SuSe
Level	[2] Bachelor (Fundamentals)
Language	[DE] German
Module Manager	Schürmann, Bernd, PD Dr.-Ing. (WMA | DEPT: INF, GS)
Lecturers	Schweitzer, Pascal, Prof. Dr. (PROF | DEPT: INF)
Area of study	[INF-LA] Teacher Education
Reference course of study	[INF-31.79-SG] B.Ed. LaGR Computer Science
Livecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
4V+2U	INF-02-06-K-2	P	U-Schein	PL1	8.0	SuSe

- About **[INF-02-06-K-2]**: Title: "Algorithms and Data Structures"; Presence-Time: 84 h; Self-Study: 156 h
- About **[INF-02-06-K-2]**: The study achievement **"[U-Schein] proof of successful participation in the exercise classes (ungraded)"** must be obtained.
  - It is a prerequisite for the examination for PL1.

Examination achievement PL1

- Form of examination: **written exam (Klausur) (120-150 Min.)**
- Examination Frequency: each summer semester

Evaluation of grades

The grade of the module examination is also the module grade.

Contents

- Basic data structures, abstract data types and their realization through data structures (lists, trees) and advanced data structures (balanced trees, hash tables)
- Basic algorithms (e.g. search and sort, graph algorithms)
- Algorithmic principles (divide and conquer, systematic search)
- Design of simple algorithms
- Distributed algorithms, concurrent processes
- Efficiency analysis of algorithms
- Time and space complexity of algorithms
- Asymptotic growth of complexity
- NP-completion and reduction
- Specification, test and verification

Competencies / intended learning achievements

The students

- know basic data structures, algorithms and basic modeling concepts;
- develop an understanding of the interaction between algorithm and data structure;
- can model, design and implement software modules and evaluate the quality of the results;
- use mathematical methods for correctness proofing and efficiency analysis and can assess the quality of algorithms.

Literature

From [INF-02-06-K-2] Algorithms and Data Structures:

- Cormen, Leiserson, Rivest, Stein: Algorithmen - Eine Einführung. Oldenbourg Verlag, 2013.
- Mehlhorn, Kurt, and Peter Sanders. Algorithms and data structures: The basic toolbox. Springer Science & Business Media, 2008.
- Nebel: Entwurf und Analyse von Algorithmen. Springer-Verlag, 2012.
- Ottmann, Widmayer: Algorithmen und Datenstrukturen. Springer-Verlag, 2012.

Requirements for attendance of the module (informal)

Programming skills.

Requirements for attendance of the module (formal)

None

References to Module / Module Number [INF-82-54-M-2]

Course of Study	Section	Choice/Obligation
[INF-31.79-SG] B.Ed. LaGR Computer Science	[Compulsory Modules] Further modules	[P] Compulsory
[INF-47.79-SG] B.Ed. LaBBS Computer Science	[Compulsory Modules] Further modules	[P] Compulsory
[INF-B4.79-SG] ZEP LaG Computer Science	[Compulsory Modules] Certificate course of studies	[P] Compulsory
[INF-B5.79-SG] ZEP LaBBS Computer Science	[Compulsory Modules] Certificate course of studies	[P] Compulsory
[INF-B2.?-SG] ZEP LaRSP Computer Science	[Compulsory Modules] Certificate course of studies	[P] Compulsory