



# Algorithmentheorie

**Module title:**

Algorithmentheorie  
Algorithms Theory

**Credits:**

6

**Responsible person:**

Niedermeier, Rolf

**Office:**

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**Contact person:**

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**Website:**

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**Display language:**

German

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## Learning Outcomes

On successful completion, students will have deepened knowledge about algorithmic methods and can design and mathematically analyze (with corresponding proof methods) efficient algorithms for computationally hard problems.

## Content

Fundamental methods in algorithm design and analysis. The course also forms a basis for further specialized lectures in the master program.

Presented topics of algorithm design include in particular:

- greedy algorithms for scheduling problems,
- divide & conquer for fast Fourier transformation,
- dynamic programming for longest common subsequence,
- network flow (preflow push algorithm),
- algorithmic approaches (with provable efficiency or solution properties) to solve NP-hard problems (approximation and fixed-parameter algorithms).

## Module Components

Course Name	Type	Number	Cycle	SWS
Grundlagen der Algorithmik	VL		SS	2
Grundlagen der Algorithmik	TUT		SS	2

## Workload and Credit Points

Grundlagen der Algorithmik (Vorlesung)	Multiplier	Hours	Total
No information	15.0	3.0h	45.0h
No information	15.0	2.0h	30.0h
			75.0h

Grundlagen der Algorithmik (Tutorium)	Multiplier	Hours	Total
No information	15.0	2.0h	30.0h
No information	15.0	3.0h	45.0h
			75.0h

Course-independent workload	Multiplier	Hours	Total
No information	1.0	30.0h	30.0h
			30.0h

The Workload of the module sums up to 180.0 Hours. Therefore the module contains 6 Credits.

## Description of Teaching and Learning Methods

The content of the course is given in a lecture. Weekly exercise sheets are discussed interactively in tutorials to consolidate and apply the lecture content.

## Requirements for participation and examination

### Desirable prerequisites for participation in the courses:

Basic knowledge on algorithms, data structures, and discrete structures.  
Successful completion of "Discrete Structures" and "Algorithms and Data Structures" is helpful.

### Mandatory requirements for the module test application:

No information

## Module completion

<b>Grading:</b>	<b>Type of exam:</b>	<b>Language:</b>
graded	Portfolio examination 100 points in total	German

### Grading scale:

Note:	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0
Punkte:	86.0	82.0	78.0	74.0	70.0	66.0	62.0	58.0	54.0	50.0

### Test description:

According to §47 (2) AllgStuPO the grade will be calculated applying grading key 1 of Fakultät IV, it may however be altered in favour of the students.

Test elements	Categorie	Points	Duration/Extent
No information	written	25	30 min
No information	written	50	80 min
No information	written	25	max. 10 pages

## Duration of the Module

This module can be completed in one semester.

## Maximum Number of Participants

This module is not limited to a number of students.

## Registration Procedures

Computer science bachelor students with QISPOS-account register via QISPOS.  
All other students register at the examination office.

## Recommended reading, Lecture notes

### Lecture notes:

unavailable

### Electronical lecture notes :

available

### Recommended literature:

Kleinberg, Jon; Tardos, Éva: Algorithm Design, 2006, Pearson/Addison-Wesley

## Assigned Degree Programs

This moduleversion is used in the following modulelists:

**Elektrotechnik/Informationstechnik als Quereinstieg (Lehramt) (Master of Education)**

Anlage 3 - StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Elektrotechnik/Informationstechnik als Quereinstieg (Lehramt) (Master of Education)**

StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Informatik (Bachelor of Science)**

StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

**Informationstechnik (Lehramt) (Master of Education)**

Kernfach StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Informationstechnik (Lehramt) (Master of Education)**

Zweifach StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Informationstechnik (Lehramt) (Bachelor of Science)**

Kernfach StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Informationstechnik (Lehramt) (Bachelor of Science)**

Zweifach StuPO 2016

Modullisten der Semester: WS 2020/21 SoSe 2021

**Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)**

StuPO 2013

Modullisten der Semester: WS 2020/21

**Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)**

StuPO 2017

Modullisten der Semester: WS 2020/21 SoSe 2021

**Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)**

StuPO 2018

Modullisten der Semester: WS 2020/21 SoSe 2021

**Technische Informatik (Bachelor of Science)**

BSc Technische Informatik StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

**Wirtschaftsinformatik (Bachelor of Science)**

BSc Wirtschaftsinformatik StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

Compulsory optional subject in computer science bachelor. If there are sufficient capacities, then the course is available for other degree programs.

**Miscellaneous**

*No information*