



# Algorithm Engineering

**Module title:**

Algorithm Engineering

**Credits:**

9

**Responsible person:**

Niedermeier, Rolf

**Office:**

TEL 5-1

**Contact person:**

Thielcke, Christlinda

**Website:**<http://www.isis.tu-berlin.de/course/>**Display language:**

German

**E-mail address:**

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## Learning Outcomes

On successful completion, students will be able to

- develop and implement efficient algorithms,
- estimate the running time and space consumption of algorithms,
- use standard algorithm libraries and adequate data structures to engineer their algorithms,
- work in teams, and
- give a short oral presentation of the main features of their implementation.

## Content

Learning Content:

The course

- gives an introduction to the basic techniques of Algorithm Engineering, with a particular focus on NP-hard problems,
- helps to design, analyze, and implement algorithms, and
- provides insight into problem modeling and solution strategies including search tree algorithms, data reduction techniques, preprocessing, approximation, heuristics, and approaches based on linear programming (using established solvers).

## Module Components

Course Name	Type	Number	Cycle	SWS
Algorithm Engineering	PJ	0434 L 215/1	WS/SS	6

## Workload and Credit Points

Algorithm Engineering (Projekt)	Multiplier	Hours	Total
No information	15.0	6.0h	90.0h
No information	15.0	12.0h	180.0h
			270.0h

The Workload of the module sums up to 270.0 Hours. Therefore the module contains 9 Credits.

## Description of Teaching and Learning Methods

Regular switch between the lecture and project work in small groups. The students apply the methods and knowledge taught in the lecture in the project work.

This includes project meetings on regular basis, presentation of mile stones, and competitions for the fastest implementation.

## Requirements for participation and examination

### Desirable prerequisites for participation in the courses:

Knowledge of the modules "Introduction into Programming", "Algorithms and Data Structures", "Software Engineering", and "Algorithms Theory".

### Mandatory requirements for the module test application:

No information

## Module completion

**Grading:**

graded

**Type of exam:**Portfolio examination  
100 points in total**Language:**

German/English

**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:**

Four milestones:

For each topic the students will develop an implementation solving specified computational tasks.

The performance of the implementation and the quality of the presentation are evaluated. In the presentations, the students explain the essential implementation decisions of their algorithms. The students justify their decisions with experimental evaluations on given test data sets.

Test elements	Categorie	Points	Duration/Extent
1. Milestone	flexible	25	<i>No information</i>
2. Milestone	flexible	25	<i>No information</i>
3. Milestone	flexible	25	<i>No information</i>
4. Milestone	flexible	25	<i>No information</i>

**Duration of the Module**

This module can be completed in one semester.

**Maximum Number of Participants**

The maximum capacity of students is 15

**Registration Procedures**

Die Anmeldung erfolgt über QISPOS (für BSc Informatik) bzw. direkt beim Prüfungsamt.

Please register at QISPOS or directly at the examination office.

**Recommended reading, Lecture notes****Lecture notes:**

*unavailable*

**Electronical lecture notes :**

available

**Assigned Degree Programs**

This moduleversion is used in the following modulelists:

**Computer Engineering (Master of Science)**

StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

**Computer Science (Informatik) (Master of Science)**

StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

**Elektrotechnik (Master of Science)**

StuPO 2015

Modullisten der Semester: WS 2020/21 SoSe 2021

**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

**Information Systems Management (Wirtschaftsinformatik) (Master of Science)**

StuPO 2013

Modullisten der Semester: WS 2020/21 SoSe 2021

**Information Systems Management (Wirtschaftsinformatik) (Master of Science)**

StuPO 2017

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

**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

*No information***Miscellaneous***No information*