Learning Outcomes

On successful completion, students will be able to:
- estimate the computational costs for solving fundamental problems
- classify discrete computational problems according to their computational complexity using reductions and standard complexity classes
- understand structural properties of complexity classes
- make qualitative and quantitative statements about computational complexity questions

Content

Introduction into structural complexity theory, with particular emphasis on complexity resources time and space. Particular topics are:

- complexity classes
- reductions between problems
- theory of the NP-completeness and the P vs. NP question
- hierarchy theorems and polynomial time hierarchy
- interactive proof systems

Module Components

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Type</th>
<th>Number</th>
<th>Cycle</th>
<th>SWS</th>
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<td>Computational Complexity</td>
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Workload and Credit Points

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<tr>
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<th>Hours</th>
<th>Total</th>
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Course-independent workload

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<td>30.0h</td>
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The Workload of the module sums up to 270.0 Hours. Therefor the module contains 9 Credits.

Description of Teaching and Learning Methods

There is a lecture 4 hours per week presenting the whole course material. The lectures are accompanied by tutorials in which distributed work sheets are solved together.

Requirements for participation and examination

Desirable prerequisites for participation in the courses:

a) obligatory: Basic course on automata and complexity
b) desirable: Basic knowledge on algorithms

Mandatory requirements for the module test application:

No information
Module completion

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
Please register at QISPOS or directly at the examination office.

Recommended reading, Lecture notes

Lecture notes:
unavailable

Electronical lecture notes:
available

Additional information:
Slides will be made available during the lecture period: www.isis.tu-berlin.de

Recommended literature:

Assigned Degree Programs
This module is used in the following module lists:

Computer Engineering (Master of Science)
StuPO 2015

Computer Science (Informatik) (Master of Science)
StuPO 2015

Double-Degree-Masterstudiengang ICT Innovation (Master of Science)
MSc ICT Innovation StuPO 2016
Modullisten der Semester: SS 2017 WS 2017/18 SS 2019

Elektrotechnik (Master of Science)
StuPO 2015

Informatik (Master of Science)
MSc Informatik PO 2013

Miscellaneous
This course is not offered regularly, you will find detailed information on our website: http://www.akt.tu-berlin.de/menue/teaching/