Berechenbarkeit und Komplexität

Module title:
Berechenbarkeit und Komplexität
Computability and Complexity

Credits:
6

Responsible person:
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Display language:
German

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Learning Outcomes

On successful completion, students will be able to apply basic concepts in computability, use Turing machines as basic model of computation, understand the border between computable and uncomputable functions, classify problems as being undecidable, understand the meaning of basic complexity classes and classify problems according to their computational difficulty.

Content

Topics include:
- Turing computability and Church-Turing thesis
- Loop- and While-computability
- primitive recursive functions
- Halting problem and undecidability
- Reducibility between problems
- Post correspondence problem
- complexity of algorithms and problems such as SAT and CLIQUE
- complexity of the decision problem for languages, computational complexity, complexity classes
- P, NP and NP-completeness
- Cook-Levin theorem for the satisfiability problem (SAT)

Module Components

Course Name	Type	Number	Cycle	SWS
Berechenbarkeit und Komplexität	VL	0401 L 145	WS	2
Berechenbarkeit und Komplexität	UE	0401 L 145/2	WS	2

Workload and Credit Points

Berechenbarkeit und Komplexität (Vorlesung)	Multiplier	Hours	Total
No information	15.0	2.0h	30.0h
No information	15.0	3.0h	45.0h
			75.0h

Berechenbarkeit und Komplexität (Übung)	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. Therefor the module contains 6 Credits.

Description of Teaching and Learning Methods

No information

Requirements for participation and examination

Desirable prerequisites for participation in the courses:

No information

Mandatory requirements for the module test application:

No information

Module completion

Grading:
graded

Type of exam:
Portfolio examination
100 points in total

Language:
German

Grading scale:
This exam uses its own grading scale (see test description)..

Test description:
No information

Test elements	Categorie	Points	Duration/Extent
No information	written	25	*No information*
No information	written	50	*No information*
No information	written	25	*No information*

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

No information

Recommended reading, Lecture notes

Lecture notes:
unavailable

Electronical lecture notes :
available

Additional information:
Folien werden über www.isis.tu-berlin.de verfügbar gemacht

Recommended literature:
Elaine Rich: Automata, Computability, and Complexity, Pearson, 2008

John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman: Einführung in Automatentheorie, Formale Sprachen und Berechenbarkeit, Pearson 3. Auflage, 2011

Uwe Schöning: Theoretische Informatik - kurzgefasst, Spektrum Akademischer Verlag, 5. Auflage, 2008

Assigned Degree Programs

This module is used in the following modulelists:

Informatik (Bachelor of Science)
- StuPO 2015
  - Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)
- StuPO 2013
  - Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)
- StuPO 2017
  - Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Naturwissenschaften in der Informationsgesellschaft (Bachelor of Science)
- StuPO 2018
  - Modullisten der Semester: WS 2018/19

Miscellaneous

No information