Algorithmics for Discrete Data Science

Learning Outcomes

Students who have completed this module can design and analyze algorithms for combinatorial data science problems. When facing a concrete computational problem, they are able to choose a strategy to efficiently solve the problem within provable performance guarantees. This includes strategies for solving problems that are computationally hard in the worst case. In particular, the students know about algorithmic research topics in discrete data science.

Content

Algorithm design and analysis for the classical computation model as well as alternative models of computation. The various models (including RAM, memory hierarchy, online, streaming, etc.) are employed in several fundamental problem domains. These domains include:
- Network analysis,
- Sequence analysis, and
- Matrix analysis.

Module Components

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Type</th>
<th>Number</th>
<th>Cycle</th>
<th>SWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithmics for Discrete Data Science</td>
<td>IV</td>
<td>0434 L 239</td>
<td>k.A.</td>
<td>4</td>
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Workload and Credit Points

<table>
<thead>
<tr>
<th>Algorithmics for Discrete Data Science (Integrierte Veranstaltung)</th>
<th>Multiplier</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>15.0</td>
<td>4.0h</td>
<td>60.0h</td>
</tr>
<tr>
<td>Pre/post processing</td>
<td>15.0</td>
<td>8.0h</td>
<td>120.0h</td>
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The Workload of the module sums up to 180.0 Hours. Therefor the module contains 6 Credits.

Description of Teaching and Learning Methods

The course consists of roughly 3/4 lecture and 1/4 tutorial parts; in the tutorials concrete problems are solved together.

Requirements for participation and examination

Desirable prerequisites for participation in the courses:
- a) obligatory: basic knowledge on algorithm design
- b) desirable: basic understanding of approximation and parameterized algorithmics; participation in the course Advanced Algorithmics

Mandatory requirements for the module test application:

No information

Module completion

<table>
<thead>
<tr>
<th>Grading:</th>
<th>Type of exam:</th>
<th>Language:</th>
<th>Duration/Extent:</th>
</tr>
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<tbody>
<tr>
<td>graded</td>
<td>Written exam</td>
<td>English</td>
<td>90 min</td>
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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

Recommended literature:
Current research literature related to the course will be made available.

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

Computer Engineering (Master of Science)
  StuPO 2015
  Modullisten der Semester: WS 2018/19 SS 2019

Computer Science (Informatik) (Master of Science)
  StuPO 2015
  Modullisten der Semester: WS 2018/19 SS 2019

Elektrotechnik (Master of Science)
  StuPO 2015
  Modullisten der Semester: WS 2018/19 SS 2019

Wirtschaftsinformatik / Information Systems Management (Master of Science)
  StuPO 2017
  Modullisten der Semester: WS 2018/19 SS 2019

Wirtschaftsingenieurwesen (Master of Science)
  StuPO 2015
  Modullisten der Semester: WS 2018/19 SS 2019

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