inf961 - Fundamental Competences in Computing Science II: Mathematics

<table>
<thead>
<tr>
<th>Module label</th>
<th>Fundamental Competences in Computing Science II: Mathematics</th>
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<tbody>
<tr>
<td>Module code</td>
<td>inf961</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Used in course of study</td>
<td>• Master's Programme Engineering of Socio-Technical Systems &gt; Fundamentals/Foundations</td>
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<tr>
<td>Contact person</td>
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Module responsibility

- Heinz-Georg Quebbemann
- Florian Heß
- Sandra Stein
- Andreas Stein
- Martin Georg Fränzle

Authorized examiners

- Die im Modul Lehrenden

Entry requirements

Skills to be acquired in this module

The courses provide an introduction to the fundamental methods of mathematical formalisation and proof, as well as to the central concepts of graph theory, elementary number theory, and algebra. The selection of topics is based on their particular relevance to computer science and related disciplines. Within the curriculum of the MSc EngSTS, this course provides students featuring a BSc in psychology or related subjects with the skills in mathematical formalization that are necessary for mastering subsequent courses in computer science.

Professional competences:
The students get acquainted with the formalisms and reasoning underlying modern mathematics, and they are able to apply these to concrete problems. They understand the central concepts and methods of graph theory, elementary number theory, and algebra relevant to computer science and related disciplines.

Methodological competences:
The students are able to apply fundamental methods of mathematical formalisation and reasoning to concrete problems. They are able to retrieve the verdicts originating from such formal reasoning and to interpret them in terms of the original, informal problem description. students:

Social competences:
The students are able to explain mathematical formalizations to each other and to discuss their justification.

Self-competences:
The students are able to reflect appropriateness of their formalisation and verification attempts.

Module contents

- Propositional logic; methods of mathematical proof; sets, relations, and functions; combinatorics;
- graphs and their applications; natural and integer numbers and their residue classes; groups and
- semi-groups.

The module consists of a lecture and an exercise part.

Reader's advisory

B. Kreußler und G. Pfister: Mathematik für Informatiker, Springer-Verlag 2009 (available online from the university library)

Links

Language of instruction

- English

Duration (semesters)

- 1 Semester

Module frequency

- compulsory

Module capacity

- unlimited

Reference text

This course is part of the base curriculum of the MSc program "Engineering of Socio-Technical Systems". It provides students featuring a background in psychology with the fundamental competences in mathematical formalization that are necessary for mastering subsequent courses in computer science. This course is not intended for students with a background in computer science.

Modullevel

- BC (Basiscurriculum / Base curriculum)

Modulart

- Pflicht o. Wahlpflicht / compulsory or optional

Lern-/Lehrform / Type of program

- V+Ü

Vorkenntnisse / Previous knowledge

Course type module

<table>
<thead>
<tr>
<th>Examination</th>
<th>Final exam of module</th>
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<tbody>
<tr>
<td>Time of examination</td>
<td>At the end of the lecture periods</td>
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<tr>
<td>Type of examination</td>
<td>written exam or oral exam</td>
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Course type

- Lecture

Comment

- SWS

2.00

Frequency

- WiSe

Workload attendance

- 28 h
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<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Exercises</td>
<td></td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
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**Total time of attendance for the module**

56 h