inf966 - Foundations of STS Eng.: Statistics and Programming

Module label: Foundations of STS Eng.: Statistics and Programming
Module code: inf966
Credit points: 6.0 KP
Workload: 180 h
Used in course of study: Master's Programme Engineering of Socio-Technical Systems > Fundamentals/Foundations
Contact person: Antje Timmer, Andreas Hein

Authorized examiners: Die im Modul Lehrenden

Entry requirements:

Skills to be acquired in this module:

Professional competences:
The students learn:
To plan, program and interpret statistical data evaluation via programming.

Methodological competences:
The students:

- understand the main statistical methods and their practical use through application
- can evaluate statistical methods regarding their qualities and their limits
- learn the use of statistical software in application scenarios
- can implement programs via a programming language
- know how to program statistical data analyses

Social competences:
The students gain experience in interdisciplinary work.

Self-competences:
The students gain experiences in

- Pursuing goals: Thinking, problem solving and acting
- Ability to analyze and evaluate the effects and relevance of datasets for specific research questions

Module contents:
The module consists of a lecture and an exercise part:
Lecture: Introduction to the concepts and methods for computer supported statistically data evaluation. Special emphasis is put on statistically methodical as well as on a basic understanding of programming languages.
1. Fundamental Computer Science Concepts in regard to the handling of imperative programming languages including:

- variable types and variable handling
- typical code structures (such as "while / for loops" or "if-then else" statements)
- data-handling and computation approaches

2. Fundamental static methodology such as:

- estimating parameters through the method of maximum likelihood
- confidence intervals and classical significance testing
- classical regression analysis
- modern advancements in regression analysis

Exercises: Stepwise practical or paper based use of the learned concepts, methods and tools.

Reader's advisory

Links
Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: Once a year
### Module capacity
unlimited

### Modullevel
BC (Basiscurriculum / Base curriculum)

### Modulart
Pflicht o. Wahlpflicht / compulsory or optional

### Lern-/Lehrform / Type of program
V+U

### Vorkenntnisse / Previous knowledge

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

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<tr>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
<td>2.00</td>
<td>WiSe</td>
<td>28 h</td>
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<tr>
<td>Exercises</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