inf500 - Modelling and Simulation of Ecological Systems

Module label: Modelling and Simulation of Ecological Systems
Module code: inf500
Credit points: 6.0 KP
Workload: 180 h
Used in course of study: Master's Programme Computing Science > Angewandte Informatik
Contact person: Ute Vogel-Sonnenschein

Entry requirements
Skills to be acquired in this module

Professional competence
The students:
- name general discrete and continuous modeling methods and space-based model designs
- explain elementary concepts of ecological systems
- characterise typical qualities as well as advantages and disadvantages of different modelling methods for ecological systems and evaluate them
- appropriately apply modelling concepts for ecological systems
- describe basic simulation methods, in particular for discrete models, and put them into practice

Methodological competence
The students:
- use basicsimulation methods for discrete models
- systematically learn about new simulation tools in a short time
- implement simple ecological models

Social competence
The students:
- solve tasks in teams of 2-3 students

Self-competence
The students:
- reflect their actions considering simulation methods

Module contents
Methods of modelling and simulation enable a detailed understanding of interdependencies in dynamic systems. In the field of ecology there are numerous methodical approaches, for example cause-effect graphs, differential equations, Markov models, L-Systems, cellular automata or individual-oriented models. These approaches are exemplary introduced by the lecture and are illustrated by exemplary core concepts of ecological systems. These modelling methods are accompanied by simulation procedures.

Software tools were and are being developed for the use of such methods. Those tools are exemplarily discussed regarding their construction and functionality. Tools for mathematical model simulations as well as individual-oriented simulations are introduced and are used in exercises.

The interpretation of simulation results leads to model validation and to a discussion on the forecast quality of models.

The module "inf500 Modellbildung in Simulation ökologischer Systeme" is accompanied by the module "inf501 Environmental Information Systems", which focuses on persistent storage of spatial information as well as concepts of data analysis. Nevertheless, the modules can be taken independently from each other.
**Reader’s advisory**

**Essential:**

- Lecture notes (are available in the lecture)

**Secondary literature:**


**Links**

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Reference text**
Associated with the module:
- inf501 Umweltinformationssysteme

**Modul level**
AS (Akzentsetzung / Accentuation)

**Modulart**
je nach Studiengang Pflicht oder Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

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<th>Examination</th>
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<th>Oral exam</th>
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<td>At the end of the lecture period</td>
<td>SWS</td>
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<td>Exercises</td>
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**Total time of attendance for the module**
56 h