mat996 - Introduction to Numerical Analysis

Module label: Introduction to Numerical Analysis
Module code: mat996
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Bachelor's Programme Business Informatics > Aufbaumodule
- Bachelor's Programme Computing Science > Wahlpflichtbereich Mathematik
- Master's Programme Computing Science > Nicht Informatik

Contact person:
Module responsibility:
- Alexey Chernov
- Frank Schöpfer

Entry requirements:

Skills to be acquired in this module:
The students learn and analyze the basic numerical methods. The students learn to implement the basic numerical methods in a computer program.

Professional competence:
The students:
- learn basic numerical methods and algorithms
- analyze properties of the numerical methods using rigorous mathematical tools
- implement the basic numerical methods in a computer program
- interpret results of computer simulations

Methodological competence:
The students:
- analyze algorithms with mathematical tools
- implement numerical algorithms for concrete problems

Social competence:
The students:
- develop solutions to given problems in groups
- accept constructive criticism

Personal competence:
The students:
- reflect their solution strategies
- deepen their understanding of the presented mathematical and algorithmical concepts with exercises and adopt the solution methods

Module contents:
- Numerical methods for linear systems: LU-, Cholesky decompositions, iterative methods
- Numerical methods for nonlinear equations: fix-point iterations, Newton's Method
- Polynomials, spline and trigonometric interpolation
- Numerical integration: Newton-Cotes, Gauss quadrature rules, adaptive quadrature and extrapolation methods
- Stability and conditioning of algorithms and problems

Reader's advisory:

Links:
- Language of instruction: German
- Duration (semesters): 1 Semester
- Module frequency: every year
- Module capacity: unlimited
- Modulelevel: AS (Akzentsetzung / Accentuation)
- Modulart: Wahlpflicht / Elective
- Lern-/Lehrform / Type of program: Analysis I, Lineare Algebra

Examination:
Final exam of module: At the end of the lecture period written exam
Final exam of module

Course type:
- Lecture

Time of examination:
- Comment: 2.67
- W/Se: 37.38 h
<table>
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<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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Total time of attendance for the module

56 h