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

Modullevel
AS (Akzentsetzung / Accentuation)

Modulart
Wahlpflicht / Elective

Lern-Lehrform / Type of program
Analysis I, Lineare Algebra

Vorkenntnisse / Previous knowledge

Examination
Final exam of module
Time of examination
At the end of the lecture period
Type of examination
written exam

Course type
Lecture
Comment
2.67

Workload attendance
37.38 h
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Total time of attendance for the module
56 h