### 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**
The students learn and analyze the basic numerical methods. The students learn to implement the basic numerical methods in a computer program.

**Skills to be acquired in this module**
- Professional competence
  - 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
  - analyze algorithms with mathematical tools
  - implement numerical algorithms for concrete problems

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

- Personal competence
  - 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
- Module level: AS (Akzentsetzung / Accentuation)
- Modulart: Wahlpflicht / Elective
- Lern-/Lehrform / Type of program: Analysis I, Lineare Algebra
- Vorkenntnisse / Previous knowledge: Analysis I, Lineare Algebra

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

**Course type**
Lecture

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**Total time of attendance for the module**

56 h