### 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
- Module level: AS (Akzentsetzung / Accentuation)
- Modulart: Wahlpflicht / Elective

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

**Examination**

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<th>Time of examination</th>
<th>Type of examination</th>
<th>Final exam of module</th>
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<td>At the end of the lecture period written exam</td>
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**Course type**
Lecture

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**Total time of attendance for the module**