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 written exam  
Type of examination: Final exam of module  
Course type: Lecture  
Comment:  
SWS: 2.67  
Frequency: WiSe  
Workload attendance: 37.38 h
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Total time of attendance for the module