**Level**: bachelor

**Course title:** Numerical Analysis (I162)

**Status**: compulsory (I0), optional (I1)

**ECTS**: 7

**Requirements**: none

**Learning objectives**

Acquiring basic knowledge and skills in numerical mathematics. Development of the mathematical mind for precision, exactness and calculation, as well as work habits. Use of computers in numerical problem solving.

**Learning outcomes**

Students will be able to apply simple numerical methods; develop skills to set up problems, implement and execute numerical algorithms, solve problems and interpret the solutions; be able to link the mathematical knowledge with computer science and other subjects; be able to use mathematical software.

**Syllabus**

*Theoretical instruction*

Approximate numbers and errors. Machine numbers and computer arithmetic. Error terms in function evaluation. Interpolation, interpolating polynomials and error terms. Numerical differentiation, difference quotients and error terms. Numerical integration. Quadrature formulas. Newton-Cotes formulas. Trapeze and Simpson's rule. Numerical equation solving. Localization of zeros. General iterative method. Special iterative methods. Systems of equations. Differential equations.

*Practical instruction*

Exercises follow the lectures and are conducted with Mathematica.

| **Weekly teaching load** | | | | Other: 0 |
|---|---|---|---|---|
| Lectures: 3 | Exercises: 2 | Other forms of teaching: 0 | Student research: 0 | |