

Course Specification Document

Title	Approximation and Data Processing
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Credits	4 ECTS
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Aims	This course aims to present the different methods of approximating numerical functions and processing functional data.
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Intended learning outcomes

On successful completion of this course, the student will be able to:

- Understand and comprehend approximation algorithms and analyze their performance.
- Employ studied algorithms in finding appropriate solutions to applied problems.
- Correct use of numerical methods in solving engineering problems.

Syllabus

- **Interpolation:** Lagrange interpolation with polynomials, effect of rounding errors in Lagrange interpolation, Hermite interpolation with polynomials, interpolation using polynomials piecewise functions, study of error interpolation by Splines.
- **Approximation of numerical functions:** Uniform approximation, least-squares approximation, functional data processing.
- **Numerical quadrature:** The principle of simple and compound quadrature methods - the order of an quadrature formula - error in quadrature formulas - Gauss's quadrature method - Romberg's quadrature method - adaptive method of numerical quadrature - improper integral.