Subject information

2026 spring

Name	Numerical analysis
Code	BPI1220
Semester	4
Credit	4
Classes/week	0+3
Subject prerequisite	BAI0172

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Semester theme:

1: Introduction to wxMaxima I. General introduction, calculator mode. Variables, functions, sequences.
2: Introduction to wxMaxima II. Calculus using Maxima. Function representation.
3: Introduction to wxMaxima III. Matrix calculus. Elements of programming.
4: Taylor series and approximation. General interpolation. Polynomial interpolation.
5: Lagrange interpolation. Neville's interpolation. Error estimations.
6: Least squares fitting, general method. Normal equation system, polynomial and exponential regressions.
7: Test 1.
8: Inverse interpolation. Bisection method. False position method.
9: Secant method. Newton (Newton-Raphson) method. Error estimations. Modified Newton's method.
10: Banach (Banach-Caccioppoli) fixed-point theorem. Successive approximation. Error estimations.
11: Numerical integration. Riemann sums. Newton-Cotes formulas. Rectangle rule, trapezoidal rule, Simpson's rule. Error estimations.
12: Repetition, practice.
13: Test 2.
14: Discussion of tests.

Participation in the sessions:

Participation in practical sessions is mandatory. The permissible amount of absence during the semester in full-time education is three times the number of weekly contact hours of the subject. If this is exceeded, the semester cannot be evaluated.

Requirements:

Active participation in classes is mandatory. Two in-class tests are taking place scheduled for week 7 and week 13. Based on these two tests a grade will be given.
The grade system for the course is the following:

Excellent (5): 80-100%
Good (4): 60-79%
Fair (3): 40-59%
Sufficient (2): 20-39%
Fail (1): 0-19%

Recommended literature:

1. Harold Cohen: Numerical Approximation Methods, Springer, 2011.

2. Walter Gautschi: Numerical Analysis, Birkhäuser Boston, 2011.
3. István Blahota: Numerical analysis - lecture outline, 2025.

Other expectations:
In every other regard, this syllabus is not covering, the Code of Studies and Examination of University of Nyíregyháza and Student Disciplinary and Compensation Rules shall apply.
https://english.nye.hu/en/node/44

February 9, 2026.

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