UNIVERSITY OF PÉCS POLLACK MIHÁLY FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY
DEPARTMENT OF MATHEMATICS
2013/2014/ 1.

LINEAR ALGEBRA AND NUMERICAL MATHEMATICS WITH HELP OF MAPLE
Copies of the approved course syllabus are available at:
www. pmmik.pte.hu

Catalogue information:
ECTS credits:
course number:

prerequisites: -
allotment of hours per week: 2 P

Instructor:
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General Course Description:[1]
Brief Syllabus: This lecture and practical based course aims to give students a mathematics basis through covering the following topics:

Solutions of equations in one variable, direct methods for solving linear systems, iterative techniques for solving linear systems, eigenvalues and eigenvectors
Interpolation techniques: Taylor and Fourier series, Lagrange and spline interpolation, least square approximation.
Numerical differentiation and integration. Initial-value and boundary-value problems for ordinary differential equations . Numerical solutions to partial differential equations

Students learn the basics of numerical mathematics enabling them to interpret and understand engineering sciences. The practical sessions the students get familiar with the Maple computer algebra system.

Methods:
The presentations give an introduction to important numerical techniques of problem solving. Equal emphasis is given to learning new mathematics and to learning how to use computer algebra in mathematics.

Learning Objectives:
Upon completion of this course the student should be able to **interpret,** and **put into practice** the numerical methods of linear algebra, the interpolation techniques, and the numerical solution of differential equations.

Required Reading and other Materials will be equivalent to:
Required Reading:

RICHARD L. BURDEN, J. DOUGLAS FAIRES: NUMERICAL ANALYSIS PWS-KENT PUBLISHING COMPANY.

[1] az akkreditációs anyag rövidleírása

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Programme:

1. Introduction to Maple
2. Solutions of equations in one variable (Newton method)
3. Direct methods for solving linear systems (Cramer rule, Gaussian elimination)
4. Iterative techniques for solving linear systems, eigenvalues and eigenvectors
5. Interpolation techniques: Taylor and Fourier series
6. Interpolation techniques: Lagrange and spline interpolation
7. 1th test
8. Least square approximation
9. Numerical differentiation and integration
10. Initial-value problems for ordinary differential equations
11. Boundary-value problems for ordinary differential equations
12. Numerical solutions to partial differential equations
13. 2nd test

Completing of the course is dependent on the following:

1. Class participation, class activity. Any unexcused absences will negatively affect your grade; 3 unexcused absences will result in failing the class. If you need to miss a class for any reason, please notify your professor by email prior to the start of that class.
2. Achieving more than 40% in the two written tests during the semester.
3. Written exam in the exam period. A minimum of 40% is required to pass the exam.

Grading scale

Grade	5	4	3	2	1
Numeric Grade	100-86	85-71	70-56	55-41	40-0

Students with special needs:
Students with special physical needs and requiring special assistance must first register with the Dean of the Students Office. All reasonable requests to provide an equal learning environment for all students is to be assured.