BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS
Faculty of Transportation Engineering and Vehicle Engineering

Course description

1. Subject name	Numerical methods				
2. Code	**KOVRM121**	**3. Evaluation**	**midterm**	**4. Credit**	**4**
5. Seminars per week	**2 lecture**	**0 practice**	**1 lab**	**6. Curriculum**	**K1 J1**

7. Needed working hours for achieving the requirements of the subject					**120**
Contact hours	42 hours	**Preparation for seminars**	11 hours	**Homework**	20 hours
Reading written syllabus	35 hours	**Exam preparation**	12 hours	**Final exam preparation**	0 hours

8. Department	**Department of Aeronautics, Naval Architecture and Railway Vehicles**
9. Responsible lecturer	Dr. Rohács József
10. Lecturers	Dr. Rohács József, Bicsák György,

11. Mandatory requirement	-
12. Recommended requirements	-

13. Objective of the subject

Introduction. System modeling. General model, assumptions, errors. Solving the non-linear equation, Newton iteration. Polynomial equations, Horner, Newton methods. Systems of linear equations: Gauss elimination, Matrices, enginvalues. Linear programming. Simplex Method. non-.linear optimization, gradient method. Interpolation. Newton's, Lagrange Hermite methods, spline. Approximation: Chebyshev, Padé. Fast Fourier transformation. Numerical differentiation, integration. Solving the differential equations. Euler, Runge-Kutta, predictor-corrector methods. Systems of partial differential equations. finite differences, finite volumes methods. Stochastic modeling.

14. Individual student assignment

Students will have to choose 3 individual assignments, which numerical results will be written and presented.

15. Assessment, requirements for examination

There will be 2 written tests. These tests and the quality of the individual assignments will result the final mark in a 1/3-1/3-1/3 proportion.