The Technical University of Košice, Faculty of Mechanical Engineering

Course unit title:	**APLLIED MATHEMATICS**
Study programme:	**Mechanical Engineering** **Mechatronics**
Study period:	**1st year, ST 2019/2020**
Faculty:	**Faculty of Mechanical Engineering**
Level of study:	**Master**
Form of study:	**Full time**
Evaluation:	**Course credit, Exam**
Number of credits:	**5**
Guaranteeing department:	**DEPARTMENT OF APPLIED MATHEMATICS AND INFORMATICS**
Guarantor:	**prof. RNDr. Martin BAČA, CSc.**

Week	**Lectures** **Number of hours: 3 per week**	**Tutorials** **Number of hours: 2 per week**
1.	Complex numbers.	Complex numbers.
2.	Matrices, determinants.	Matrices, determinants.
3.	System of linear equations.	System of linear equations.
4.	Iterative methods solving system of linear equations.	Iterative methods solving system of linear equations.
5.	Eigenvalues and eigenvectors.	Eigenvalues and eigenvectors.
6.	General description of operations research. Introduction to linear programming.	Linear programming models.
7.	Linear programming models and solutions.	Graphical approach to solving linear programming models.
8.	Simplex method, simplex tableau, standard simplex method.	Simplex method, simplex tableau, standard simplex method.
9.	Duality in linear programming, economic interpretation.	*Mid-term test.*
10.	Dual simplex algorithm.	Duality in linear programming. Dual simplex algorithm.
11.	Ordinary differential equations. Boundary value problems.	Boundary value problems for ordinary differential equations.
12.	Calculus of variations.	Variational problems.
13.	Variational problems.	Applications of variational problems.

Recommended reading:

1. Bača, M., Feňovčíková, A.: Mathematics 1, C-PRESS, Košice, 2010.
2. Bača, M., Feňovčíková, A.: Mathematics 2, C-PRESS, Košice, 2010.
3. Burden, R. L., Faires, J. D.: Numerical Methods, Brooks/Cole, Boston, 2012.
4. Downing, D.: Calculus, Barron's Educational Series, Inc., New York, 2006.
5. Elsgolc, L. E.: Calculus of Variations, Dover Publications, Mineola, New York, 2007.
6. Chapra, S., Camale, R.: Numerical Methods for Engineers, McGraw-Hill, 2010.
7. Vanderbei, R. J.: Linear programming: Foundation and Extensions, 4th edition, English, 2013.

Evaluation:

CONTINUOUS EVALUATION

Mid-term test:	**20 points**
C o u r s e c r e d i t:	**total points 20 (required minimum 11)**

The necessary condition for obtaining a course credit is to write down homework assignments.

FINAL EVALUATION – EXAM

Computational part:	**50 points**
Theoretical part:	**30 points**
T o t a l:	**total points 80 (required minimum 41)**

Attendance of lectures and classes is compulsory.

Košice, 7th February, 2020

Signature of guarantee

You can find these information on webpage
http://www.sjf.tuke.sk/kamai/vyucba/predmety-v-letnom-semestri/sjf-ls