Course unit title:	APPLIED MATHEMATICS
Course code:	23005869
Study programme:	Mechanical Engineering
Study period:	1st year, ST 2023/2024
Faculty:	Faculty of Mechanical Engineering
Level of study:	Master
Form of study:	Full time
Evaluation:	Course credit, Exam
Number of credits:	6

Guaranteeing department: Guarantor:

DEPARTMENT OF APPLIED MATHEMATICS AND INFORMATICS doc. RNDr. Miriam ANDREJIOVÁ, PhD.

Week	Lectures	Tutorials
	Number of hours: 3 per week	Number of hours: 2 per week
1.	Complex numbers.	Complex numbers.
2.	Elementary linear algebra.	Matrices, determinants, inverse of a matrix.
3.	System of linear equations.	Direct methods for solving systems of linear equations.
4.	Iterative methods for solving system of linear equations.	Iterative methods for solving system of linear equations.
5.	Eigenvalues and eigenvectors.	Eigenvalues and eigenvectors.
6.	General description of operations research. In- troduction to linear programming.	Linear programming models.
7.	Methods of solving linear programing prob- lems.	Graphical approach to solving linear program- ming models.
8.	Simplex method, simplex tableau, standard simplex method.	Simplex method, simplex tableau, standard simplex method.
9.	Special cases of linear programming problems.	Mid-term test.
10.	Ordinary differential equations. Initial value problems. Boundary value problems.	Special cases of linear programming problems. Solving linear programming problems using Excel.
11.	Boundary value problems of higher order dif- ferential equations.	Boundary value problems of higher order dif- ferential equations.
12.	Calculus of variations.	Variational problems.
13.	Applications of 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
Course credit:	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, 8th February, 2024