

The Technical University of Košice, Faculty of Mechanical Engineering

Course unit title: **MATHEMATICS II.**  
 Study programme: **Automotive Production  
 Mechanical Engineering  
 Mechatronics**

Study period: **1st year, ST 2019/2020**  
 Faculty: **Faculty of Mechanical Engineering**  
 Level of study: **Bachelor**  
 Form of study: **Full time**  
 Evaluation: **Course credit, Exam**  
 Number of credits: **6**

Guaranteeing department: **DEPARTMENT OF APPLIED MATHEMATICS AND INFORMATICS**  
 Guarantor: **prof. RNDr. Martin BAČA, CSc.**

Week	Lectures Number of hours: 2 per week	Tutorials Number of hours: 2 per week
1.	Definition of the definite integral. Properties of the definite integral. The fundamental theorem of calculus. Definite integral with variable upper limit.	The fundamental theorem of calculus. Definite integral with variable upper limit.
2.	Substitution in definite integral. Integration by parts for definite integral.	Substitution in definite integral. Integration by parts for definite integral.
3.	Applications of definite integral.	Area in the plane. Volume of revolution. Length of plane curve. The area of a surface of revolution.
4.	Improper integral.	Improper integral of type 1. Improper integral of type 2.
5.	Functions of several variables. Limits and continuity. Partial derivatives. Higher order derivatives.	Functions of two or more independent variables. Partial derivatives. Higher order derivatives.
6.	Tangent planes and normal lines. Total differential. Maxima and minima.	Tangent planes and normal lines. Total differential. Maxima and minima.
7.	Ordinary differential equations. Separable equations. Homogeneous equations.	Separable equations. Homogeneous equations.
8.	Exact equations. Integrating factors.	<i>Mid-term test.</i> Exact equations. Integrating factors.
9.	First order linear equations. Bernoulli differential equations.	First order linear equations. Bernoulli differential equations.
10.	Higher order linear equations. Linear equations with constant coefficients – homogeneous.	Higher order linear equations. Linear equations with constant coefficients – homogeneous.
11.	Linear equations with constant coefficients – non-homogeneous.	Linear equations with constant coefficients – non-homogeneous.
12.	Linear differential systems. Homogeneous linear systems with constant coefficients.	Homogeneous linear systems with constant coefficients.
13.	Non-homogeneous linear systems with constant coefficients.	Non-homogeneous linear systems with constant coefficients.

**Recommended reading:**

1. Bača, M., Feňovčíková, A.: Mathematics 2, C-PRESS, Košice, 2010.
2. Knežo, D., Andrejiová, M., Kimáková, Z.: Matematika 1, Časť B: Neurčitý integrál, algebra, analytická geometria, Technická univerzita, Košice, 2010 (in Slovak).
3. Knežo, D., Andrejiová, M., Kimáková, Z.: Matematika 2, Technická univerzita, Košice, 2010 (in Slovak).
4. Strang, G.: Calculus, Wellesley-Cambridge Press, 1991.
5. Thomas, G.B., Finney, R.L.: Calculus and Analytic Geometry, Addison-Wesley Publishing Company, New York, 1990.

**Prerequisites:** Mathematics I.**Evaluation:****CONTINUOUS EVALUATION**Mid-term test: **20 points**

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**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**

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**T o t a l: total points 80 (required minimum 41)****Attendance of lectures and classes is compulsory.**

Košice, 7th February, 2020

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Signature of guarantee