The Technical University of Košice, Faculty of Mechanical Engineering

Course unit title:	**MATHEMATICS I.**
Study programme:	**Automotive Production** **Mechanical Engineering**
Study period:	**1st year, WT 2019/2020**
Faculty:	**Faculty of Mechanical Engineering**
Level of study:	**Bachelor**
Form of study:	**Full time**
Evaluation:	**Course credit, Exam**
Number of credits:	**8**
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.	Matrices, operations with matrices. Determinants. Properties of determinants.	Matrices, operations with matrices. Determinants, calculationg determinants.
2.	System of linear equations. Gaussian elimination method. Cramer's rule. Inverse of a matrix.	Gaussian elimination method. Cramer's rule. Inverse of a matrix.
3.	Introduction to functions. Elementary functions.	Domain of a function. Properties of functions. Inverse functions.
4.	Limits. Continuity of functions.	Limit of a function.
5.	Definition of the derivative. Techniques of differentiation. Differential of a function.	Derivative of a function.
6.	Higher-order derivatives. Continuous functions with derivative. L'Hospital's rule.	Higher-order derivatives. L'Hospital's rule.
7.	Tangent line. The mean value theorem. Increasing and decreasing functions. Local maxima and local minima.	Increasing and decreasing functions. Local extrema.
8.	Concavity and points of inflection. Graphing functions.	*Mid-term test.* Concavity and points of inflection.
9.	Indefinite integrals. Properties of the indefinite integral.	Graphing functions. Standard integrals and rules of integrations.
10.	Integration by substitution. Integration by parts.	Integration by substitution. Integration by parts.
11.	Integration of rational functions.	Decomposition of a rational function to partial fractions. Integration of rational functions.
12.	Integration of irrational functions.	Integration of irrational functions.
13.	Integration of rational function of sine and cosine. Integration of transcendental functions.	Integration of rational function of sine and cosine.

Recommended reading:

1. Bača, M., Feňovčíková, A.: Mathematics 1, C-PRESS, Košice, 2010.
2. Eliáš, J., Horváth, J., Kajan, J.: Zbierka úloh z vyššej matematiky 1. a 2. časť, Alfa, Bratislava, 1995 (in Slovak).
3. Knežo, D., Andrejiová, M., Kimáková, Z.: Matematika 1, Časť A: Funkcia jednej premennej a jej diferenciálny počet, Technická univerzita, Košice, 2010 (in Slovak).
4. Knežo, D., Andrejiová, M., Kimáková, Z.: Matematika 1, Časť B: Neurčitý integrál, algebra, analytická geometria, Technická univerzita, Košice, 2010 (in Slovak).
5. Šoltés, V., Juhásová, Z.: Zbierka úloh z vyššej matematiky I, Olympia, Košice, 1992 (in Slovak).

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**
Total:	**total points 80 (required minimum 41)**

Attendance of lectures and classes is compulsory.

Košice, 20th September, 2019

Signature of guarantee

You can find these information on webpage
http://www.sjf.tuke.sk/kamai/students/syllabi