

The Technical University of Košice, Faculty of Mechanical Engineering

Course unit title:           **MATHEMATICS III.**  
 Course code:               **23005194**  
 Study programme:         **Automotive Production**  
                                   **Mechanical Engineering**

Study period:               **2st year, WT 2024/2025**  
 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	Tutorials
	Number of hours: 2 per week	Number of hours: 2 per week
1.	Definition of double integral. Properties of double integrals. Iterated integrals.	Double integral.
2.	Transformation in double integrals. Polar coordinates. Generalized polar coordinates. Applications of double integrals.	Transformation in double integrals.
3.	Triple integral. Transformation in triple integrals. Applications of triple integrals.	Triple integral. Transformation in triple integrals.
4.	Line integrals of scalar functions.	Line integrals of scalar functions.
5.	Line integrals of vector fields. Green's theorem. Conservative vector fields.	Line integrals of vector fields.
6.	The applications of the line integral. The numerical infinite series.	Green's theorem. The applications of the line integral.
7.	Special types of series. Tests for convergence of series.	The numerical infinite series. Tests for convergence of series.
8.	Alternating series. Absolute convergence.	<i>Mid-term test.</i> Alternating series.
9.	Functional series. Power series.	Power series.
10.	Taylor series. Applications of power series.	Taylor series.
11.	Fourier series. Orthogonal functions.	Solutions of differential equations using by infinite series.
12.	Fourier series of periodic functions. Convergence of Fourier series.	Fourier series of periodic functions.
13.	Fourier series of non-periodic functions.	Fourier series of non-periodic functions.

**Recommended reading:**

1. Bača, M., Feňovčíková, A., Kimáková, Z.: Mathematics 3, TU Košice, 2016.
2. Downing, D.: Calculus, Barron's Educational Series, Inc., New York, 2006.
3. Small, D.B., Hosack, J.M.: Calculus An Integrated Approach, McGraw-Hill Series in Higher Mathematics, 1990.
4. Doboš, J., Záškalická, M.: Zbierka úloh z matematiky III, Elfa, Košice, 2002. (in Slovak).
5. Eliáš, J., Horváth, J., Kajan, J.: Zbierka úloh z vyššej matematiky 3. časť, Alfa, Bratislava, 1995. (in Slovak).
6. Knežo, D., Andrejiová, M., Kimáková, Z.: Matematika 2, Technická univerzita, Košice, 2010. (in Slovak).

**Prerequisites:** Mathematics II.**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, 18th September, 2024

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Signature of guarantee

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