

FACULTY:	Department of Mechanical Engineering
FIELD OF STUDY:	Transport
ERASMUS COORDINATOR OF THE FACULTY:	Dr hab. inż. Agnieszka Kułakowska, Prof. PK
E-MAIL ADDRESS OF THE COORDINATOR:	agnieszka.kulakowska@tu.koszalin.pl
COURSE TITLE:	Mathematics III
LECTURER'S NAME:	Prof. Volodymyr Sushch
E-MAIL ADDRESS OF THE LECTURER:	volodymyr.sushch@tu.koszalin.pl
COURSE CODE (USOS):	6
ECTS POINTS FOR THE COURSE:	2 ECTS
ACADEMIC YEAR:	2025/2026
SEMESTER: (W – winter, S – summer)	W
HOURS IN SEMESTER:	15 + 15
LEVEL OF THE COURSE: (1 st cycle, 2 nd cycle, 3 rd cycle)	1 st cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lecture + practice
LANGUAGE OF INSTRUCTION:	English
ASSESSMENT METOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written exam
COURSE CONTENT:	<p>1. Integral calculus The indefinite integral of real-valued functions of a single real variable</p> <ul style="list-style-type: none"> • Formal definition • Properties of integrals • Finding the value of an integral (integration) • Higher derivatives <p>Techniques for computing integrals</p> <ul style="list-style-type: none"> • Intagration by substitution • Intagration by parts • Intagration by trigonometric substitution • Intagration by reduction formulae • Intagration by partial fractions • Intagration using Euler's formula <p>The definity integral (the Riemann integral)</p> <ul style="list-style-type: none"> • Definition and properties • Fundamental theorem of calculus (the Newton-Leibniz theorem) <p>Applications of definity integrals Improper integrals</p> <ul style="list-style-type: none"> • Convergence of the integral • Singularities <p>2. Ordinary differential equations (ODE) Basic concepts and classifying of differential equations. Solutions of differential equations (a particular solution and the general solution of a differential equation). Initial-value and boundary-value problems. First order ODE: Separable equations, Homogeneous equations, Exact equations, Linear equations (homogeneous and non-homogeneous), Bernoulli equations, Solved problems. Second order linear ODE: Linear differential equations (linearly independent solutions, the Wronskian), Linear homogeneous ODE with constant coefficients, (the characteristic equation), Linear non-homogeneous ODE with constant coefficients, The method of undetermined coefficients, Variation of parameters, Linear ODE with variable coefficients.</p>
ADDITIONAL INFORMATION:	

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