



## Subject card

Subject name and code	Mathematics III, PG_00055104						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Mathematics Center -> Vice-Rector for Education						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Leszek Ziemczonek				
	Teachers		dr Leszek Ziemczonek				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		5.0		90.0	125
Subject objectives	The aim of this subject is to obtain the students competence in the range of using the basic methods of mathematical analysis and linear algebra. Furthermore, the student is able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U01] is able to acquire information from specialized literary sources, databases and other resources, essential for solving engineering tasks; is able to compile the obtained information pieces and to interpret them, additionally is able to form conclusions and present justified opinion		Student combines knowledge of mathematics with knowledge from other fields.				
[K6_W01] possesses mathematical knowledge within the range of linear algebra and mathematical analysis useful in characterising and interpreting mechanical systems, technological processes and operational properties of devices		Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.		[SW2] Assessment of knowledge contained in presentation			

Subject contents	<p>Number series. Convergence tests of the number series.</p> <p>Triple integrals and their applications. Volume of solids. Mass of body.</p> <p>Complex numbers. Operations on complex numbers.</p> <p>Algebraic and trigonometric forms.</p> <p>Moirve formula.</p> <p>Radicals of complex numbers.</p> <p>Ordinary differential equations. First order differential equations.</p> <p>General and particular solution.</p> <p>Separable variables, linear, Bernoulli differential equations.</p> <p>Second order linear differential equations with constant coefficients.</p> <p>Non-homogeneous linear differential equations.</p>											
Prerequisites and co-requisites	Knowledge of differential and integral calculus of one variable functions. Knowledge of matrix calculus.											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1267 794 1301">Subject passing criteria</th> <th data-bbox="798 1267 1136 1301">Passing threshold</th> <th data-bbox="1139 1267 1485 1301">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1305 794 1339">written exam</td> <td data-bbox="798 1305 1136 1339">50.0%</td> <td data-bbox="1139 1305 1485 1339">50.0%</td> </tr> <tr> <td data-bbox="456 1341 794 1368">midterm colloquium</td> <td data-bbox="798 1341 1136 1368">50.0%</td> <td data-bbox="1139 1341 1485 1368">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	written exam	50.0%	50.0%	midterm colloquium	50.0%	50.0%
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Recommended reading	Basic literature	<p>Jankowska K., Jankowski T.: Funkcje wielu zmiennych, całki wielokrotne, geometria analityczna. Wyd. PG, Gdańsk, 2006.</p> <p>Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk 2007.</p> <p>Gewert M., Skoczylas Z.: Analiza matematyczna 2. Oficyna Wydawnicza GiS, Wrocław, 2003.</p> <p>Krysicki W., Włodarski L.: Analiza matematyczna w zadaniach cz. II. PWN, Warszawa, 1994.</p>										

	Supplementary literature	<p>Fichtenholz G. M.: Rachunek Różniczkowy i całkowy. PWN, Warszawa, 1995.</p> <p>Leja F.: Rachunek różniczkowy i całkowy ze wstępem do równań różniczkowych. PWN, Warszawa, 1977.</p> <p>Leitner R.: Zarys matematyki wyższej dla studiów technicznych. WNT, Warszawa, 1994.</p> <p>Żakowski W., Kołodziej W.: Matematyka cz. II. WNT, Warszawa, 1992.</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>1. Use triple integral to calculate volume of solid bounded by surfaces:</p> $x^2 + y^2 - 2z = 0, z = 2.$ <p>2. Solve differential equation:</p> $y'' - 5y' + 4y = 4x^2e^{2x}.$	
Work placement	Not applicable	