



## Subject card

Subject name and code	Mathematics III, PG_00039943						
Field of study	Management and Production Engineering, Management and Production Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Full-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 inż. Magdalena Łapińska				
	Teachers		dr inż. Magdalena Łapińska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
WIMiO - ZiIP sem.3 - Matematyka 3 2021/22 (M.Łapińska) - Moodle ID: 16402 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16402">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16402</a>							
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	60		7.0		58.0	125
Subject objectives	The aim of this subject is to obtain the student's competence in the range of using the basic methods of mathematical analysis. 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_K03	Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process. Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.			[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		
	K6_W01	Student demonstrates some techniques for solving ordinary differential equations. Student determines general and particular solutions of systems of differential linear equations. Student determines general and particular solutions of a first-order partial linear differential equations.			[SW1] Assessment of factual knowledge		
K6_U05	Student combines knowledge of mathematics with knowledge from other fields. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future.			[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment			
Subject contents	First order differential equations • introductory concepts, • separated variable equation • homogeneous differential equation, • linear differential equation, • Bernoulli equation, • an exact differential equation, integrating factor, • numerical solution of differential equations Second and higher order linear differential equation • introductory concepts, body vibrating motion • methods of solving differential equations of the second order and higher: the method of varying the constant and the method of indefinite coefficients Laplace transform • introduction, properties, operator method for solving differential equations Systems of differential equations • introductory concepts, various methods of solving, stability testing and • numerical methods for solving systems of equations Partial differential equations • classification of equations • canonical form • method of separating variables • string, wave and Laplace equation						
Prerequisites and co-requisites	Positive grade for the subject Mathematics 1 and 2.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		written exam , 90 minutes	50.0%
Recommended reading	Basic literature	G.M. Fichtenholz, Rachunek różniczkowy i całkowy, Tom 1, Wydawnictwo Naukowe PWN, Warszawa 2002 , B.Wikieł, Matematyka, Podstawy z elementami matematyki wyższej, Wydawnictwo Politechniki Gdańskiej Gdańsk 2009, K.Jankowska, J.Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej Gdańsk 2003, W. Krywicki, L. Włodarski „Analiza matematyczna w zadaniach” część I, PWN, Warszawa 1986.	
	Supplementary literature	M.Gewert, Z.Skoczylas, Analiza matematyczna 1, Przykłady i zadania, GiS, Wrocław 2000, R.Leitner, W.Matuszewski, Z.Rojek, Zadania z matematyki wyższej, cz. 1, WNT, Warszawa 1992, W.Żakowski, Ćwiczenia problemowe dla politechnik, WNT, Warszawa, 1991.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Find the special integral of a first-order linear non-uniform differential equation.</li> <li>2. Find the general integral of the third-order equation with constant coefficients.</li> <li>3. Determine the type of partial differential equation given.</li> <li>4. Calculate the Laplace transform of the function using the definition.</li> </ol>		
Work placement	Not applicable		