



Subject card

Subject name and code	Differential equations II, PG_00021047						
Field of study	Mathematics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Differential Equations and Mathematical Applications -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Agnieszka Bartłomiejczyk					
	Teachers	dr Agnieszka Bartłomiejczyk					
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						
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		5.0		70.0	135
Subject objectives	Acquiring basic knowledge of qualitative theory of differential equations. Consolidating and developing the ability to solve ordinary differential equations and boundary value problems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
Subject contents	<ol style="list-style-type: none">Elements of the theory of stability: the Lyapunov stability, stability of constant coefficient linear system, stability of solutions of n order linear equations, stability of solutions of nonlinear systems, the Lyapunov function.Boundary value problems: linear boundary value problem, the Green function for ODEs, properties of solutions of second-order linear differential equations, the Sturm comparative theorem, the Sturm-Liouville problem, periodic Sturm-Liouville problem.The Laplace transform: basic properties of the Laplace transform, Inverse Laplace transform. Using the Laplace transform method to solve the differential equation.						
Prerequisites and co-requisites	The knowledge of Mathematical Analysis, Differential Equations I						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	tests		50.0%		60.0%		
	exam		50.0%		40.0%		
Recommended reading	Basic literature		<ol style="list-style-type: none">Z. Kamont, Równania różniczkowe zwyczajne, Wydawnictwo Uniwersytetu Gdańskiego, 1999A. Pelczar, J. Szarski, Wstęp do teorii równań różniczkowych, PWN, 1984W. Walter, Ordinary differential equations, Springer, 1988				
	Supplementary literature		<ol style="list-style-type: none">J. Banasiak, K. Szymańska-Dębowska, Układy dynamiczne w modelowaniu procesów przyrodniczych, społecznych i technologicznych, PWN, 2023.B.P. Demidowicz, Matematyczna teoria stabilności, WNT, 1972.M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, GiS, 2004.J. Muszyński, A.D. Myszkis, Równania różniczkowe zwyczajne, PWN, 1984.				
	eResources addresses		Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	Give the definition of stability in the sense of Lyapunov. Sketch and interpret the phase portret for autonomous linear constant coefficient systems. Solve linear ordinary differential equations using Laplace transform.						

Work placement	Not applicable
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