

Subject card

Subject name and code	Introduction to Biomathematics, PG_00174018						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group				
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Danuta Jaruszewska-Walczak				
	Teachers						
Lesson types	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		0.0		0.0	60
Subject objectives	The aim is to knowing students with classical models and methods of biomathematics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MMiADL3_U08] is able to plan a way to solve a given problem and make a correct record of this solution, providing accurate and precise justifications for the correctness of their reasoning		The student is able to prepare a solution to a specific mathematical problem used to model biological phenomena, along with a precise justification for the correctness of the reasoning.		[SU4] test/exam - oral or written		
	[MMiADL3_W08] knows and understands well the role and importance of proof in mathematics, as well as the concept of the significance of assumptions		The student knows and understands proofs of theorems and understands the role of constructing reasoning related to the issues learned for recurrence and differential equations applicable to modeling biological phenomena.		[SW4] test/exam - oral or written		
	[MMiADL3_U07] can comprehensively, in speech and in writing, formulate definitions and theorems and present correct mathematical reasoning regarding the issues learned		The student is able to provide understanding of definitions and theorems as well as correct reasoning related to the topics learned in biomathematics.		[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written		
	[MMiADL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning		The student is ready to formulate questions aimed at deepening the understanding of a given topic.		[SK1] oral statement/conversation/discussion [SK8] observation of student's independent or team work		

Subject contents	Recurrence equations and ordinary differential equations in historical and heuristic population models, including discrete and continuous ones.		
	Differential and discrete logistic equation and with delay - applications in population dynamics.		
	Theory of first-order partial equations, von Foerster equation in the population model with age structure.		
	Autonomous system of ordinary differential equations, approximation by a linear system - application in predator-prey models.		
	Optional: main epidemic models; crocodile survival environment; dynamics of marital interactions; model of enzymatic reactions.		
Prerequisites and co-requisites	Knowledge of the basics of differential and integral calculus.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	observation of student behavior	100.0%	0.0%
	test	51.0%	50.0%
	exam	51.0%	50.0%
Recommended reading	Basic literature	J. D. Murray, Wprowadzenie do biomatematyki, Wydawnictwo Naukowe PWN, 2006.	
		U. Foryś, Matematyka w biologii, WNT, 2005.	
		R. Rudnicki, Modele i metody biologii matematycznej, cz. I: Modele deterministyczne, IMPAN, 2014.	
	Supplementary literature	Not required	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Not required		
Work placement	Not applicable		

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