

Subject card

Subject name and code	Discrete dynamic systems, PG_00179496						
Field of study	Informatics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
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	academic		Assessment form				
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Paweł Klinga				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	20.0	0.0	0.0	40
	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	40		0.0		0.0	40
Subject objectives	Celem przedmiotu jest zapoznanie studentów z tematyką dyskretnych układów dynamicznych.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFL3_W02] has knowledge of discrete mathematics and probabilistic methods and statistics		Student is able to analyze the behavior of a dynamic system using methods presented during the course.		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[INFL3_U01] can apply mathematical knowledge to formulate, analyze and solve problems related to computer science		Student addresses the methods presented during the lecture and, using Python, applies the algorithms in order to solve problems.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		
Subject contents	Elementary recurrence relations and their solutions in Python Leslie model of population distribution Nonlinear dynamic systems: tent function, logistic map and their graphical iterations Fixed points and periodic points of discrete dynamic systems and their stability Bifurcation diagram, Lyapunov exponent Complex dynamic systems, Julia and Mandelbrot sets Fractals, fractal dimension						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Exam		51.0%		50.0%		
	Project		51.0%		50.0%		
Recommended reading	Basic literature		Stephen Lynch, Dynamical Systems with Applications using Python, Springer, 2018. G.C. Layek, An Introduction to Dynamical Systems and Chaos, Springer, 2015.				
	Supplementary literature		adapted to the implemented project				

	eResources addresses	
Example issues/ example questions/ tasks being completed	Analysis of a population change in a given Leslie model Analysis of a long-term behavior of a dynamic system given by a logistic map	
Work placement	Not applicable	

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