

Subject card

Subject name and code	Applications of probability in computer science, PG_00209912						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master'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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		7.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Monika Wrzosek				
	Teachers		dr Monika Wrzosek				
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		110.0	150
Subject objectives	The aim of the course is to familiarize students with the concepts of probability theory and stochastic processes, with particular emphasis on their applications in the modeling and analysis of selected queueing systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFMU2_W01] has in-depth knowledge of the branches of mathematics necessary for the study of computer science; has a good understanding of the role and importance of the construction of mathematical reasoning		The student has structured knowledge of probability theory and stochastic processes and understands the role and importance of mathematical reasoning in the analysis and modeling of problems in computer science.		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[INFMU2_U09] is able to present the results of research in the form of an independently prepared dissertation (paper) containing a description and justification of the purpose of the work, the methodology adopted, the results and their significance in comparison with other similar studies		The student is able to prepare and present the results of probabilistic analyses and stochastic models in the form of a structured report, including the objective, description of the applied methods, and interpretation of the obtained results.		[SU2] presentation/project/paper/report		
	[INFMU2_U01] can apply mathematical knowledge to formulate, analyze and solve tasks related to computer science		The student is able to apply mathematical knowledge in probability theory and stochastic processes to formulate, analyze, and solve problems related to computer science, in particular in the context of modeling random and queueing systems.		[SU4] test/exam - oral or written		

Subject contents	1. Probability 2. Discrete random variables (binomial and Poisson distributions) 3. Continuous random variables (exponential, gamma, and normal distributions, central limit theorem) 4. Monte Carlo method 5. Selected topics in stochastic processes (Markov chains, counting processes: binomial and Poisson) 6. Selected topics in queueing theory (Little's law, M/M/1 model, characteristics of queueing systems)		
Prerequisites and co-requisites	Fundamentals of linear algebra and probability theory		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	51.0%	30.0%
	Exam	51.0%	70.0%
Recommended reading	Basic literature	Michael Baron, Probability and Statistics for Computer Science, University Chapman&Hall/CRC, 2019.	
	Supplementary literature	none	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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