GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Risk management in insecure enviroment , PG_00025524
Field of study	Mathematics

Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle 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	4.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Nonlinear Analysis and Statistics -> Faculty of Applied Physics and Mathematics -> Wydziały Politechniki Gdańskiej

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Karol Dziedziul
	Teachers	dr hab. Karol Dziedziul

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	0.0	0.0	45
	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	45	6.0	49.0	100

Subject objectives	Presentation of knowledge in the field of risk management methods. Development of analytical skills in the field of risk management.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W03	A student has in-depth knowledge used in the risk management process. A student has in-depth knowledge of the methods and tools used in the risk management process.	[SW3] Assessment of knowledge contained in written work and projects
	K6_U10	The student is able to program in SAS and in the R language.	[SU1] Assessment of task fulfilment
	K6_U05	A student knows the theory of copulas. A student can apply Sklar's theorem. A student understands the Strong Law of Large Numbers. A student knows and applies the Monte Carlo method.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task

Subject contents	Mathematical finance in one period - Arbitrage theory - Preferences - Optimality and equilibrium - Monetary measures of risk - Dynamic hedging - Dynamic arbitrage theory - American contingent claims - Superhedging - Efficient hedging - Hedging under constraints - Minimizing the hedging error - Dynamic measures of risk - The basic properties of copulas and some of their major applications
Prerequisites and co-requisites	the probability theory and an introduction to statistics

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	assessment of knowledge of the subject basics (24 questions)	50.0%	33.4%
	grade for exercises	50.0%	33.3%
	lab evaluation	50.0%	33.3%
Recommended reading	Basic literature	• Hans Föllmer, Alexander Schied **Stochastic Finance**, An Introduction in DiscreteTime, 2nd Revised and Extended Edition, de Gruyter, Berlin, New York, 2004. • A. McNeil, R. Frey, P. Embrechtes, **Quantitive Risk Management**, Princeton University Press, 2005.	
	Supplementary literature	• Ravindra Khattree, Dayanand N. Naik, **Applied Multivariate Statistics with SAS Software**, John Wiley & Sons, Inc., 2nd edition, 2003. • R.B. Nelsen, **An introduction to copulas**, Springer, 2006	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Please specify reserves for investment exposure to gold and stock markets.		
Work placement	Not applicable		

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