



Subject card

Subject name and code	VOLATILITY MODELING AND MARKET RISK ANALYSIS, PG_00060822						
Field of study	Economic Analytics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			English		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Katedra Statystyki i Ekonometrii -> Faculty of Management and Economics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Michał Pietrzak				
	Teachers		dr hab. Michał Pietrzak				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	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		3.0		27.0	75
Subject objectives	Analyzes financial and capital markets using in-depth knowledge of model structures and applicable methods						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U03] formulates research problems and selects appropriate analytical methods for their effective solution, using advanced IT tools, and evaluates the results critically		uses complex models, taking into account factors relevant to the studied phenomena and selecting analytical methods that ensure effective solutions		[SU3] Assessment of ability to use knowledge gained from the subject		
[K7_W05] takes into account in the analyzes in an in-depth way both the economic, legal and ethical context, being aware of the responsibility for the consequences of its decisions		models financial and capital markets, ensuring the effectiveness of its decisions in the economic and legal context		[SW1] Assessment of factual knowledge			
Subject contents	Financial and capital markets, the problem of modeling both markets, empirical examples Efficiency of the capital market, basic methods of researching information effectiveness The problem of obtaining, sharing and distributing financial data by institutions in the light of market efficiency and institutional requirements Information effectiveness research methods Efficiency of the capital market, basic methods of researching information effectiveness The problem of financial data visualization Empirical properties of financial data, identification and testing Modeling the rate of return and the level of risk for individual financial instruments using models from the ARMA-GARCH family The task of modeling long memory and persistence in capital markets VaR modeling and the concept of implied volatility Modeling the rates of return, the level of risk and the level of interdependence for a portfolio of financial instruments using multidimensional GARCH models The problem of investment portfolio management, one-dimensional and multidimensional approaches VaR for the investment portfolio						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Exam		60.0%		70.0%		
	Test		60.0%		30.0%		

Recommended reading	Basic literature	Jajuga K., Jajuga T. Inwestycje, PWN, 2011 Tarczyński W. Rynki kapitałowe Vol. I. Metody ilościowe, Placet, 2001 Tarczyński W. Rynki kapitałowe Vol. II. Metody ilościowe, Placet, 2001 David G. Luenberger Teoria inwestycji finansowych Wydaw. Naukowe PWN, 2003 David Ruppert, David S. Matteson Statistics and Data Analysis for Financial Engineering Springer, 2015
	Supplementary literature	Zvi Bodie, Alex Kane, Alan J. Marcus Investments McGraw-Hill Education, 2021 Piotr Fiszeder Modele klasy GARCH w empirycznych badaniach finansowych Wydawnictwo Naukowe Uniwersytetu Mikołaja Kopernika, 2009 Oliver Linton Financial Econometrics: models and methods Cambridge University Press, 2019
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	