University of Gdańsk

Subject card

Subject name and code	Modelling on Financial Market, PG_00178516		
Field of study	Informatics and Econometrics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	Bachelor's studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	7.0
Learning profile	academic	Assessment form	exam
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Sabina Nowak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	16.0	16.0	8.0	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	2.0	133.0	175

Subject objectives

1. Understanding the fundamental financial properties of time series, as well as modeling and forecasting methods.
2. Exploring the various types of factor models used to describe time series of returns in the capital market, and developing the ability to apply these models in financial analysis.
3. Grasping the concept of an efficient market as explained by Fama, and being able to present rational arguments both for and against the efficiency of the capital market.
4. Learning the basic principles governing the operation of financial markets, particularly in relation to their microstructure.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEL3_W05] To an advanced degree, the student knows and understands the methods, techniques and informatics or statistics tools used to acquire, collect, process and present data in decision-making processes.	The student identifies different types of data related to financial market phenomena and can visualize them.	[SW2] presentation/project/paper/ report [SW5] implementation of a problem task
[IiEL3_U02] Students can select or construct econometrics, informatics or statistics tools and apply them to describe and solve economic and social problems.	The student selects an appropriate factor model to describe the rates of return on financial instruments.	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task
[IiEL3_U03] Students can obtain data from appropriately selected sources, use these data to solve economic and social problems, and process and interpret them using econometrics, informatics or statistics tools.	The student collects financial data from various databases, both cross-sectional and time-series, verifies its accuracy, and utilizes it to construct models that describe the financial market.	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task
[IiEL3_U04] Students can build and interpret models of economic and social phenomena and processes for decision-making processes.	The student specifies models based on transaction indicators for making investment decisions.	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task
[IiEL3_U07] The student can prepare written papers, presentations, and oral speeches on problems in econometrics, informatics, or statistics.	The student works in a team to develop an issue related to the market efficiency hypothesis or the financial market microstructure and presents the model to the group.	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task
[IiEL3_W02] To an advanced degree, the student knows and understands selected theoretical and practical issues in informatics, statistics or econometrics necessary for understanding economic and social phenomena.	The student understands and correctly applies models for time series of financial market return rates.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report

Subject contents

1. Characteristics and features of financial time series.
2. Basic concepts related to financial time series. Stationarity. White noise. Correlogram. Autocorrelation function. Unit root tests.
3. Modelling financial time series. ARMA, ARIMA, and SARIMA models.
4. Forecasting stock returns based on financial time series models. Measures of forecast quality.
5. Estimation and verification of asset pricing models: Sharpe, CAPM, and APT models; Fama and French's multifactor asset pricing models; stochastic discount factor model as a generalization.
6. The efficient market hypothesis and its forms. Testing for weak efficiency - series tests, examination of calendar effects. Testing for semi-strong efficiency - momentum and contrarian strategies, event study analysis. Testing for strong efficiency - examination of investment fund performance.
7. Financial market microstructure: definition, various forms of market organization, and their characteristics. High-frequency data. Examples from global markets.
8. Intraday trading patterns in stock returns, bid-ask spreads, and volumes.
9. Trade classification rules and their accuracy.
10. Bid-ask spread models based on transaction indicators. Factors explaining the bid-ask spread.

Prerequisites and co-requisites

Students need a basic understanding of mathematical statistics for formulating and testing statistical hypotheses, knowledge of econometrics for standard single-equation and multi-equation models, and an understanding of the capital market for investing under risk conditions.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Credit for tutorials: test	51.0%	25.0%
Credit for labs: project with presentation	51.0%	25.0%
Written exam	51.0%	50.0%

Recommended reading

Basic literature	1. Doman M., Doman R. (2009), Modelowanie zmienności i ryzyka. Metody ekonometrii finansowej. Oficyna Wolters Kluwer, Kraków. 2. Gurgul H. (2012), Analiza zdarzeń na rynkach akcji: wpływ informacji na ceny papierów wartościowych. Wolters Kluwer, Warszawa. 3. Osińska M. (2006), Ekonometria finansowa, PWE, Warszawa.
Supplementary literature	1. Cuthbertson K., Nitzsche D. (2004), Quantitative Financial Economics. Stocks, Bonds & Foreign Exchange. 2nd ed. Wiley, Chichester (pozycja dostępna w czytelni BUG). 2. Doman M. (2011), Mikrostruktura giełd papierów wartościowych, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań. 3. Mills T.C., Markellos R.N. (2010), The Econometric Modelling of Financial Time Series, 3rd ed. Cambridge University Press, NY (wersja elektroniczna dostępna w bibliotece UG, eBook Collection (EBSCOhost)).
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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