University of Gdańsk

Subject card

Subject name and code	Fundamentals of Time Series Analysis, PG_00178702						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2026/2027			
Education level	Master's studies		Subject group	Obligatory subject group in the field of study 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	1		Language of instruction	Polish			
Semester of study	1		ECTS credits	6.0			
Learning profile	academic		Assessment form	exam			
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Anna Zamojska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	8.0	16.0	0.0	0.0	32
	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	32		2.0	116.0	150	
Subject objectives	The course aims to provide students with the foundational concepts of time series analysis and the knowledge of some popular time series models.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEMU2_U01] Can creatively and profoundly analyze complex social and economic processes using structured knowledge, econometrics, informatics, or statistics tools	The student can estimate a time series model, justify the goodness of fit, and construct a graphical illustration of the quantitative analysis.	[SU2] presentation/project/paper/ report
[IiEMU2_W01] Possesses a profound understanding of the nature and evolution of theories in management, quality sciences, economics, and finance. They know these fields' significance within the broader social sciences. Additionally, the student learns the main trends in developing informatics and statistics tools	The student recognises time series and recalls their properties, requiring acquiring knowledge from quantitative and qualitative research.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[IiEMU2_W02] Comprehends advanced theoretical and practical concepts in econometrics, informatics, or statistics, which are essential for a deeper understanding of economic and social phenomena	The student describes and defines the different elements of time series describing economic and social phenomena.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[IiEMU2_U03] Is able to obtain and verify data from properly selected sources and to collect, process, and visualize it using modern econometrics, informatics or statistics tools	Based on available databases, the student decomposes the components of a time series and applies methods of analysis adequate to its specifics.	[SU2] presentation/project/paper/ report

Subject contents

1. Basic concepts: time series and their characteristics, components of a time series and their extraction, differences in time series and cross-sectional analysis.
2. Dynamic indices analysis.
3. Development trend models: linear and non-linear, speed and rate of change, stability tests for structural parameters.
4. Modelling time series using trend models.
5. Modelling seasonality in trend models.
6. Time series exponential smoothing: Brown, Holt, Winers (additive and multiplicative).
7. Time series filtering.
8. Autocorrelation testing: causes and effects of random component autocorrelation, concept of covariance and autocorrelation, Ljung-Box and Box-Pierce tests.
9. Testing the stationarity of time series: Concept of stationarity. Concept and types of non-stationarity. Unit root and stationarity tests.
10. Distributed lag models: Koyck model, Almon model, individual and cumulative multipliers.

Prerequisites and co-requisites

Students should have an elementary knowledge of statistics and practical skills in data acquisition and data mining.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	51.0%	75.0%
Project	51.0%	25.0%

Recommended reading

Basic literature	1. Charemza W., Deadman D. (1997), Nowa ekonometria, Polskie Wydawnictwo Ekonomiczne. 2. Nielsen A. (2023), Szeregi czasowe. Praktyczna analiza i predykcja z wykorzystaniem statystyki i uczenia maszynowego, HELION. 3. Zagdański A., Suchwałko A. (2015), Analiza i prognozowanie szeregów czasowych, PWN.
Supplementary literature	A. Aczel, Statystyka w zarządzaniu, PWN.
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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