

**Subject card**

<b>Subject name and code</b>	Fundamentals of Time Series Analysis, PG_00177452						
<b>Field of study</b>	Informatics and Econometrics						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			English		
<b>Semester of study</b>	1	<b>ECTS credits</b>			6.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>	Department of Econometrics -> Faculty of Management -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr hab. Anna Zamojska				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	15.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	60		4.0		86.0	150
<b>Subject objectives</b>	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
	[liEMU2_W01] The student 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
	[liEMU2_W02] The student 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
	[liEMU2_U01] The student 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
	[liEMU2_U03] The student 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	<ol style="list-style-type: none"> <li>1. Basic concepts: time series and their characteristics, components of a time series and their extraction, differences in time series and cross-sectional analysis.</li> <li>2. Dynamic indices analysis.</li> <li>3. Development trend models: linear and non-linear, speed and rate of change, stability tests for structural parameters.</li> <li>4. Modelling time series using trend models.</li> <li>5. Modelling seasonality in trend models.</li> <li>6. Time series exponential smoothing: Brown, Holt, Winers (additive and multiplicative).</li> <li>7. Time series filtering.</li> <li>8. Autocorrelation testing: causes and effects of random component autocorrelation, concept of covariance and autocorrelation, Ljung-Box and Box-Pierce tests.</li> <li>9. Testing the stationarity of time series: Concept of stationarity. Concept and types of non-stationarity. Unit root and stationarity tests.</li> <li>10. Distributed lag models: Koyck model, Almon model, individual and cumulative multipliers.</li> </ol>		
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%	50.0%
	Project	51.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Charemza W., Deadman D. (1997), Nowa ekonometria, Polskie Wydawnictwo Ekonomiczne.</li> <li>2. Nielsen A. (2023), Szeregi czasowe. Praktyczna analiza i predykcja z wykorzystaniem statystyki i uczenia maszynowego, HELION.</li> <li>3. Zagdański A., Suchwałko A. (2015), Analiza i prognozowanie szeregów czasowych, PWN.</li> </ol>	
	Supplementary literature	-	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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