# GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

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| Subject name and code | TIME SERIES MODELING, PG_00063724 |
| Field of study | Economic Analytics |

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| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2024/2025 |
| Education level | second-cycle 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 | Full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | English |
| Semester of study | 1 | ECTS credits | 5.0 |
| Learning profile | general academic profile | Assessment form | exam |

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| Conducting unit | Katedra Statystyki i Ekonometrii -> Faculty of Management and Economics |

| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. Michał Pietrzak |
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| | Teachers | dr hab. Michał Pietrzak |

| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 30.0 | 0.0 | 30.0 | 0.0 | 0.0 | 60 |
| | 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 |
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| | Number of study hours | 60 | 5.0 | 60.0 | 125 |

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| Subject objectives | Effectively uses in-depth knowledge of economic time series analysis methods, applying the results of analyzes to formulate forecasts |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
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| | [K7_W04] analyzes complex problems in an in-depth way on the basis of reliable data and properly selected methods, obtaining logical solutions | creates time series models using known methods of their estimation, using advanced statistical software | [SW1] Assessment of factual knowledge |
| | [K7_U03] formulates research problems and selects appropriate analytical methods for their effective solution, using advanced IT tools, and evaluates the results critically | formulates research problems of complex economic phenomena, the solutions of which uses for forecasting, carrying out a critical assessment of the results | [SU3] Assessment of ability to use knowledge gained from the subject |

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| Subject contents | Classical time series analysis (trend, cyclical fluctuations)<br>Exponential smoothing models<br>Holt and Winters model<br>Stochastic processes and time series<br>Characteristics of stochastic processes<br>Process spectrum autocorrelation functions<br>Study of the stationarity of the time series<br>Autoregressive (AR) processes<br>Moving average (MA) processes<br>Mixed processes (ARMA)<br>Non-stationary mixed autoregression-moving average (ARIMA) processes<br>Identification and estimation of models of stochastic processes<br>Time series testing and forecasting |
| Prerequisites and co-requisites | |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|---|
| | Project | 60.0% | 50.0% |
| | Exam | 60.0% | 50.0% |

| Recommended reading | Basic literature | T. Kufel, Ekonometria Rozwiązywanie problemów z wykorzystaniem programu GRETL, PWN, 2011<br>M. Osińska, Ekonometria współczesna, TNOiK, 2007<br>Box G.E.P. i Jenkins G.M. Analiza szeregów czasowych PWN, Warszawa, 1983<br>Kot S.M., Sokołowski A., Jakubowski J. Statystyka, Difin, Warszawa, 2007 |
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| | Supplementary literature | R. Otnes, L. Enochson, Analiza numeryczna szeregów czasowych, WNT<br>A. Weron, R. Weron, Inżynieria finansowa, WNT<br>C. Ngai Hang, Time series: applications to finance with R and Splus, Wiley |
| | eResources addresses | Adresy na platformie eNauczanie: |
| Example issues/ example questions/ tasks being completed | What is a stochastic process and a time series?<br>What is time series stationarity (including weak stationarity)?<br>When is an AR(1) autoregression process stationary?<br>What are the consequences of parameter j for the intervals (0;1) and (-1;0)<br>How do we define the AR(3) function?<br>How do we define the MA(2) moving average function?<br>State the stationarity condition of the ARMA process (p;q)<br>In what situations do we use the generalized ARIMA model to model a time series? | |
| Work placement | Not applicable | |