

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analizyka predykcyjna**Name of subject in English: Predictive analytics****Main field of study (if applicable): Business Engineering****Specialization (if applicable): Business Intelligence****Profile: academic****Level and form of studies: 2nd level, full-time****Kind of subject: obligatory****Subject code W08IZZ-SM8013****Group of courses YES**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	75		75		
Form of crediting	Exam				
For group of courses mark (X) final course	X				
Number of ECTS points	6				
including number of ECTS points for practical classes (P)			3		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,36		1,28		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Programming skills in Matlab / Octave, R or Python environments
2. Knowledge of the basics of probability theory and mathematical statistics

SUBJECT OBJECTIVES

C1: Acquiring knowledge about forecasting and the ability to apply it in business practice

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 Knows advanced forecasting methods. Has an in-depth knowledge of selected linear and non-linear forecasting techniques for decision support in a changing or uncertain environment.

relating to skills:

PEU_U01 Is able to choose the right forecasting method and build a forecasting model. Can assess the quality of forecasts. Can use forecasting techniques to solve complex management decision problems.

relating to social competences:

PEU_K01 Is aware of the need for independent, critical assessment of the scope and level of knowledge in the field of predictive analytics. Is prepared to independently search for knowledge in this area.

PROGRAMME CONTENT		
Lecture		Number of hours
Lec 1-2	The forecaster's toolbox: Training, validation and testing, seasonal decomposition, transformations, point vs probabilistic forecasts	4
Lec 3	Exponential smoothing	2
Lec 4-5	Time series regression models	4
Lec 6-7	Evaluating forecast accuracy, residual diagnostics	4
Lec 8-9	Neural networks, shallow vs deep, recurrent and LSTM networks	4
Lec 10-11	Combining forecasts, bootstrapping and bagging	4
Lec 12-13	Forecasting hierarchical or grouped time series	4
Lec 14-15	Quantile regression	4
	Total hours	30

Laboratory		Number of hours
Lab 1-2	The forecaster's toolbox: Training, validation and testing, seasonal decomposition, transformations, point vs probabilistic forecasts	4
Lab 3	Exponential smoothing	2
Lab 4-5	Time series regression models	4
Lab 6-7	Evaluating forecast accuracy, residual diagnostics	4
Lab 8-9	Neural networks, shallow vs deep, recurrent and LSTM networks	4
Lab 10-11	Combining forecasts, bootstrapping and bagging	4
Lab 12-13	Forecasting hierarchical or grouped time series	4
Lab 14-15	Quantile regression	4
	Total hours	30

TEACHING TOOLS USED
N1. Multimedia presentations. N2. Computational tasks in MATLAB/Octave, Python or R.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes	Way of evaluating learning outcomes achievement
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F1	PEU_W01, PEU_U01, PEU_K01	Assignments (in-class, reports)
F2	PEU_W01, PEU_U01	Exam
P = F1 + F2; computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE	
<u>PRIMARY LITERATURE:</u>	
[1] R. Hyndman, G. Athanasopoulos (2021) <i>Forecasting: Principles and Practice</i> , 3 rd ed., OTexts (https://otexts.com/fpp3)	
<u>SECONDARY LITERATURE:</u>	
[1] F. Diebold (2015) <i>Comparing predictive accuracy, twenty years later: A personal perspective on the use and abuse of Diebold-Mariano tests</i> , Journal of Business & Economic Statistics 33:1, 1-9	
[2] G. Elliott, C.W.J. Granger, A. Timmermann, eds. (2006) <i>Handbook of Economic Forecasting</i> , North Holland	
[3] R. Hyndman, A. Koehler (2006) <i>Another look at measures of forecast accuracy</i> , International Journal of Forecasting 22(4), 679-688	
[4] J. Nowotarski, R. Weron (2018) <i>Recent advances in electricity price forecasting: A review of probabilistic forecasting</i> , Renewable and Sustainable Energy Reviews 81(1), 1548-1568	
[5] R. Weron (2014) <i>Electricity price forecasting: A review of the state-of-the-art with a look into the future</i> , International Journal of Forecasting 30(4), 1030-1081	
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)	
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