

## FACULTY OF MANAGEMENT

**SUBJECT CARD****Name of subject in Polish: Analizyka opisowa****Name of subject in English Descriptive 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-SM8028****Group of courses NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	<b>30</b>		<b>30</b>		
Number of hours of total student workload (CNPS)	<b>100</b>		<b>50</b>		
Form of crediting	<b>Examination</b>		<b>crediting with grade</b>		
For group of courses mark (X) final course					
Number of ECTS points	<b>4</b>		<b>2</b>		
including number of ECTS points for practical classes (P)			<b>2</b>		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	<b>1,36</b>		<b>1,28</b>		

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Basic knowledge of probability theory

**SUBJECT OBJECTIVES**

C1 Knowledge and understanding of the statistical methods used for data description and inferences

C2 Education skills of data descriptions

C3 Education of skills of data analysis

**SUBJECT EDUCATIONAL EFFECTS**

relating to knowledge:

PEU\_W01 – Knows how to describe and approximate the distribution of a random variable. Understands how to apply the theory to empirical problems.

PEU\_W02 – Knows methods of modeling continuous data with a linear and a non-linear regression model. Understands how to apply the theory to empirical problems.

PEU\_W03 – Knows methods of modeling discrete data. Understands how to apply the theory to empirical problems.

Relating to skills:

PEU\_U01 - Understands and is able to use theoretical knowledge in statistics to describe the properties of the data and analyze the relationship between variables.

PEU\_U02 - Understands and is able to use theoretical knowledge in statistics and econometrics to infer from the data about social or economic processes

Relating to social competences:

PEU\_K01 - Can prepare in a small group solutions to practical statistical problems and present the results of the analysis

<b>PROGRAMME CONTENT</b>		
<b>Lecture</b>		<b>Number of hours</b>
L1	Introduction; Data types	2
L2	Measures of dispersion and location	2
L3	Approximation of the distribution of the data – kernel estimation	2
L4	Modeling relationship between variables: descriptive analysis (correlation), graphical presentation (scatterplot) and regression	2
L5-6	Least Square (LS) estimation method - constrained and unconstrained optimization	4
L7-8	Application of LS to a linear regression model: model specification and verification	4
L9-10	Application of LS to a nonlinear regression model (Smooth Transition Regression)	4
L11	Principal component (PC) method – reduction of the data dimension	2
L12-13	Regularization methods (LASSO)	4
L14-15	Probit/logit models of binominal data	4
	<b>Total</b>	<b>30</b>
<b>Laboratory</b>		<b>Number of hours</b>
Lab1	Introduction to Matlab (scripts, functions)	2
Lab2	Loading and visualization of the data	2
Lab3	Measures of dispersion and location	2
Lab4	Approximation of the distribution of the data – kernel estimation	2
Lab5	Modeling relationship between variables: descriptive analysis (correlation), graphical presentation (scatterplot) and regression	2
Lab6-8	Application of LS to a linear regression model: model specification and verification, restrictions	6

Lab9-10	Application of LS to a nonlinear regression model (Smooth Transition Regression)	4
Lab1 1-13	Shrinkage methods: Principal components (PC) , LASSO	6
Lab 14-15	Probit/logit models of binominal data	4
	TOTAL HOURS	30

TEACHING TOOLS USED
Lectures N1. Multimedia presentation N2. Solving of exemplary problems Laboratories N3.matlab and R environment N4. Multimedia presentation

#### EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_W02, PEU_W03	Exam, in a scale 2-5.5
F2—F6	PEU_U01, PEU_U02, PEU_K01	Assignments 1-5, expressed in percentage points (%)

P(Lecture) = F1

P(Lab) = (F2+F3+F4+F5+F6)/5 - computed in percentage points (%), transformed into the scale 2-5.5

PRIMARY AND SECONDARY LITERATURE
<b><u>PRIMARY LITERATURE:</u></b> [1] Peck, Olsen, Devore, (2015), <i>Introduction to statistics and data analysis</i> , Cengage Learning, Inc. <b><u>SECONDARY LITERATURE:</u></b> [1] Greene W.H. (2019), <i>Econometric Analysis</i> , Pearson Education Limited [2] Wooldridge, J.M. (2014), <i>Introductory Econometrics : A Modern Approach</i> , South Western Educational Publishing [3] Heiss F. (2016), <i>Using R for Introductory Econometrics</i> , CreateSpace Independent Publishing Platform [4] Gordon S.I., B. Guilfoos (2017), <i>Introduction to Modeling and Simulation with MATLAB® and Python</i> , CRC Press
<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>
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