

Fundamentals of business analytics - course description

General information	
Course name	Fundamentals of business analytics
Course ID	04.2-WE-BizEIP-PodAnalBiz-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	E-business
Education profile	practical
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2021/2022

Course information	
Semester	2
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Laboratory	30	2	-	-	Credit with grade

Aim of the course

- expose students to advanced quantitative and qualitative data analysis procedures
- develop skills of using statistical software in data analysis
- develop skills of analysing and forecasting time series

Prerequisites

Data analysis fundamentals

Scope

Statistical software for business analytics. Elements of using JMP software: data tables; graphs; reports; scripts; formula editor; simulation techniques; descriptive statistics and statistical inference. Elements of using the SAS system: elements of the language; data step; data processing; proc step; global expressions; graphics; basic statistical procedures; debugging. Using Enterprise Guide. Fundamentals of using the R system: elements of R language, programming, data processing and visualization.

Analysis of dependence between quantitative variables. Linear regression model. Properties of least-squares estimators. Regression model diagnostics. Outliers, leverage points and influential observations. Transformations to achieve linearity. Logistic regression.

Analysis of variance. One-way analysis. F-test for ANOVA. Relations to regression analysis. Multiple comparisons. Two-way analysis.

Analysis for qualitative variables. Testing hypotheses for one variable. Testing uniformity. Testing independence for two random variables.

Random sampling from a finite population. Representative method. Estimators of population parameters for various sampling schemes.

Monte Carlo method. Generation of pseudo-random numbers. Estimation of distribution parameters using the Monte Carlo method. Permutation tests. Bootstrap method.

Rank methods. Comparison of feature distributions in two populations. Tests for pairwise comparisons. Rank tests for independence. Comparison of feature distributions in many populations. Rank methods for linear regression.

Dimensionality reduction methods. Principal component analysis. Factor analysis. Components defined by the user.

Time series analysis and forecasting. Aggregation and interpolation of time series. Exponential smoothing without seasonality. Confidence intervals for the forecasts. Exponential smoothing in forecasting for time series with seasonality. Exponential smoothing vs, parametric models AR, MA, ARMA, ARIMA. Models with hidden components.

Teaching methods

Lecture - conventional lecture.

Labs - laboratory exercises using SAS software.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
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Outcome description	Outcome symbols	Methods of verification	The class form
Can select parametric models and assess their quality		<ul style="list-style-type: none"> • an evaluation test • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory
Knows the possibilities and limitations of statistical analytical methods		<ul style="list-style-type: none"> • an exam - oral, descriptive, test and other 	<ul style="list-style-type: none"> • Lecture
Can design and carry out an experiment complying with standards of statistical inference		<ul style="list-style-type: none"> • an evaluation test • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory
Can assess the informative value of surveys as a basis for making decisions		<ul style="list-style-type: none"> • an evaluation test • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory
Knows assumptions and principles of statistical methods used to solve problems in economics		<ul style="list-style-type: none"> • an exam - oral, descriptive, test and other 	<ul style="list-style-type: none"> • Lecture
Is able to analyze and present statistical data		<ul style="list-style-type: none"> • an evaluation test • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory
Can use professional statistical software		<ul style="list-style-type: none"> • an evaluation test • carrying out laboratory reports 	<ul style="list-style-type: none"> • Laboratory

Assignment conditions

Recommended reading

1. Daniel T. Larose (2008): *Data Mining Methods and Models*, Wiley-IEEE Press
2. Geoff Der, Brian S. Everitt (2015): *Essential Statistics Using SAS University Edition*, SAS Institute Inc., Cary, NC
3. Venkat Reddy Konasani, Shailendra Kadre (2015): *Practical Business Analytics Using SAS*, Apress, New York
4. Gregory Lee (2015): *Business Statistics Made Easy in SAS*, SAS Institute Inc., Cary, NC
5. Anders Milhøj (2013): *Practical Time Series Analysis Using SAS*, SAS Institute Inc., Cary, NC
6. Sandra Schlotzhauer (2009): *Elementary Statistics Using SAS*, SAS Institute Inc., Cary, NC

Further reading

Notes

Modified by dr hab. inż. Marek Kowal, prof. UZ (last modification: 12-07-2021 11:41)

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