Project: „Improving competences in data analysis”
implemented under POWER co-financed

from the European Social Fund (Contract No: POWR.03.01.00-00-W032/18)

COURSE GUIDE

Methods, techniques and tools used in data analysis

Course name	**Methods, techniques and tools used in data analysis**
Field of study	**All fields of study at the Faculty of Management, Czestochowa University of Technology**
Form of study	**e-learning**
Level of qualification	**I and II degree**
Year	**2020/2021**
Semester	**5 and 6 (3-year I degree studies), 6 and 7 (3.5-year I degree studies), 3 and 4 (2-year II degree studies)**
Leading unit	**Business Informatics and Ecosystems Department Faculty of Management Czestochowa University of Technology**
Preparer	**Ph.D. Paula Bajdor, Ph.D. Eng. Ilona Pawełoszek**
Profile	**Pan-academic**
Type of subject	**Additional to choose**

Fundusze Europejskie
Wiedza Edukacja Rozwój

Unia Europejska
Europejski Fundusz Społeczny

Project: „Improving competences in data analysis"
implemented under POWER co-financed

from the European Social Fund (Contract No: POWR.03.01.00-00-W032/18)

COURSE DESCRIPTION

1. MAIN OBJECTIVE: Improving skills in data analysis

Specific objectives:

1. Increasing the level of knowledge in the area of data analysis, its role in decision making support processes, data analysis goals and tools used.
2. Acquiring practical knowledge and skills of using software to perform optimization and create mathematical models
3. Acquiring the ability to create and modify pivot tables
4. Acquiring the ability to present data using charts and pivot maps
5. Increasing the level of knowledge and practical skills in the application of statistical functions
6. Acquiring practical knowledge of statistical software
7. Acquiring the ability to import external data into spreadsheets
8. Acquiring data clustering skills
9. Acquiring data classification skills
10. Acquiring skills to conduct basket analysis

2. PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The student has knowledge of computer skills concerning the use of office applications and the Internet.
2. The student has language skills at intermediate level (in case of selecting the English language version)
3. The student has basic knowledge of subjects realized in the course of studies at the Faculty of Management such as: mathematics, statistics, economics and marketing.

Project: „Improving competences in data analysis”
implemented under POWER co-financed

from the European Social Fund (Contract No: POWR.03.01.00-00-W032/18)

3. LEARNING OUTCOMES

EK 1- The student is able to indicate usage areas of selected data analysis techniques to support research and make business decisions

EK 2 - The student knows the terminology used in the field of data analysis in Polish or English (depending on the selected language version of the course)

EK 3 - The student knows how to use data analysis software

EK4 - The student is able to draw conclusions from the results of the analyses and present them in the form of reports using verbal description, tables and charts.

4. PROGRAM CONTENT

Form of classes - Lectures and exercises on the e-learning platform	Liczba godzin
Introductory lecture	2
The application of Solver in Excel	2
Pivot tables	2
Pivot charts and pivot maps	2
Statistical functions in Excel	2
Analysis Toolpack	2
Power Query	2
Data clustering	4
Data classification	4
Basket analysis	4

Project: „Improving competences in data analysis"
implemented under POWER co-financed

from the European Social Fund (Contract No: POWR.03.01.00-00-W032/18)

5. TEACHING TOOLS

1. A computer with Internet access
2. Software provided by Stat-soft Statistica (provided by the university), Excel spreadsheet (or similar), Orange (Open Source)
3. E-learning course on Navoica e-learning platform

6. EVALUATION METHODS (F – FORMULATING, P – SUMMARIZING)

F1. Questions and quizzes testing knowledge on an e-learning platform
F2. Active participation in the e-learning course
F3. Completing tasks according to the course schedule
P1. Tasks to be solved on your own

7. BASIC AND SUPPLEMENTARY LITERATURE

- Analiza i prezentacja danych w Microsoft Excel [Data analysis and presentation in Microsoft Excel]. Vademecum Walkenbacha, Michael Alexander, John Walkenbach
- Microsoft Excel 2016 Analiza i modelowanie danych biznesowych [Business Data Analysis and Modelling], Wayne L. Winston, wyd. Promise 2017
- Analiza statystyczna [Statistical analysis]. Microsoft Excel 2016 PL, Conrad Carlberg, wyd. Helion 2018
- Excel. Wykresy, analiza danych, tabele przestawne. Niebieski podręcznik, [Excel. Charts, data analysis, pivot tables. Blue Handbook] Paul McFedries, wyd. Helion 2015
- Przetwarzanie danych w Excelu. Laboratorium Power Query, [Data processing in Excel. Power Query Laboratory] Marcin Cichocki, wyd. Helion 2020
- Metody i narzędzia eksploracji danych [Data mining methods and tools], Stanisław Osowski, wyd. BTC 2017

- Internetowy podręcznik statystyki [Online statistics manual] https://www.statsoft.pl/textbook/stathome.html
- Dokumentacja oprogramowania Orange [Orange software documentation] https://orange.biolab.si/docs/

8. THE COURSE INSTRUCTORS (NAME, SURNAME, E-MAIL ADDRESS)

1. Ph.D. Paula Bajdor, e-mail: paula.bajdor@pcz.pl
2. Ph.D. Ilona Pawełoszek, e-mail: ilona.paweloszek@pcz.pl
3. Ph.D. Damian Dziembek, e-mail: damian.dziembek@pcz.pl
4. Ph.D. Aleksandra Ptak, e-mail: aleksandra.ptak@pcz.pl
5. Ph.D. habil. Marta Starostka-Patyk, e-mail: m.starostka-patyk@pcz.pl
6. Ph.D. Andrzej Chluski, e-mail: andrzej.chluski@pcz.pl
7. Ph.D. Tomasz Turek, e-mail: tomasz.turek@pcz.pl

9. EVALUATION FORMS - DETAILS

Effects	Grade 2	Grade 3	Grade 4	Grade 5
EK 1- The student is able to indicate usage areas of selected data analysis techniques to support research and make business decisions	The student does not know any areas of selected data analysis techniques selection	The student knows the basic areas of using selected data analysis techniques to support research and making business decisions	The student has full knowledge about the area that uses selected data analysis techniques to support research and business decision making	The student has full knowledge of the areas of using selected data analysis techniques to support research and making business decisions. Each given example can be applied to research and economic practice.

Project: „Improving competences in data analysis”
implemented under POWER co-financed

from the European Social Fund (Contract No: POWR.03.01.00-00-W032/18)

EK 2 –The student knows the terminology used in the field of data analysis in Polish or English (depending on the selected language version of the course)	The student does not know the terminology used in the area of data analysis	The student knows the basic terms used in the field of data analysis	The student is fluent in the terminology used in the area of data analysis	The student is fluent in the terminology used in the area of data analysis, the student is able to provide definitions of terms and provide examples of its application
EK 3 – The student knows how to use data analysis software	The student is not able to use data analysis software	The student knows the basic functions of data analysis software	The student is well versed in the functions of data analysis software	The student is able to fluently use the functions of data analysis software
EK4 - The student is able to draw conclusions from the results of the analyses and present them in the form of reports using verbal description, tables and charts	The student is not able to interpret the results obtained from the analyzes and present them in the form of reports using verbal description, tables and charts	The student is able to interpret the results of analyzes to a limited extent and present them in the form of a simple report	The student correctly interprets the results of analyzes and const ructs reports using verbal description of tables and graphs.	The student is fluent in interpreting the results of analyzes and constructs advanced and aesthetic reports using the verbal description of tables and charts.

11. OTHER USEFUL INFORMATION ABOUT THE SUBJECT

1. Information on where to get acquainted with presentations for classes, etc.

   - the information will be presented at the first organizational meeting, and sent by e-mail to the students’ e-mail addresses.

2. Information on places and dates of meetings with lecturers

   - information will be provided on the e-learning platform and sent electronically to the students' email addresses.

3. Information on deadlines

   - information will be provided on the e-learning platform and sent electronically to the students' email addresses.