Faculty of Fundamental Problems of Technology

COURSE CARD

| | | |
|---|---|---|
| Name in polish | : | **Eksploracja Danych** |
| Name in english | : | **Data Mining** |
| Field of study | : | Computer Science |
| Specialty (if applicable) | : | |
| Undergraduate degree and form of | : | masters, stationary |
| Type of course | : | optional |
| Course code | : | E2_W14 |
| Group rate | : | Yes |

| | Lectures | Exercides | Laboratory | Project | Seminar |
|---|---|---|---|---|---|
| Number of classes held in schools (ZZU) | 30 | 15 | 15 | | |
| The total number of hours of student workload (CNPS) | 70 | 55 | 55 | | |
| Assesment | pass | | | | |
| For a group of courses final course mark | X | | | | |
| Number of ECTS credits | 2 | 2 | 2 | | |
| including the number of points corresponding to the classes of practical (P) | | 2 | 2 | | |
| including the number of points corresponding occupations requiring direct contact (BK) | 2 | 1 | 1 | | |

PREREQUISITES FOR KNOWLEDGE, SKILLS AND OTHER POWERS

It is required to pass the following modules: Introduction to the Computer Science and Programming, Data Bases and Information Managements, Logic and Formal Structures, Probabilistic Methods and Statistic.

COURSE OBJECTIVES

**C1** Presentation of the methods of data mining

**C2** Profound understanding of the presented data mining methods

**C3** Ability to use selected algorithms in practice

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

**W1** Knows the data mining algorithms

**W2** Knows the applicatinon of the data mining algorithms

The student skills:

**U1** Can use the data mining algorithms in practice

**U2** Can use the Apache Spark platform for efficient processing of large datasets

The student's social competence:

**K1** Has the ability to cooperate with other experts specialized in data mining algorithms

| COURSE CONTENT | | |
|---|---|---|
| Type of classes - lectures | | |
| Wy1 | Introduction to the Data Mining | 2h |
| Wy2 | Building and evaluating the model | 2h |
| Wy3 | Linear regression and related methods | 4h |
| Wy4 | Resampling methods | 2h |
| Wy5 | Classification algororithms | 6h |
| Wy6 | Dimensionality reduction | 4h |
| Wy7 | Unsupervised learning | 2h |
| Wy8 | Effective implementation of machine learning algorithms | 4h |
| Wy9 | Analysis of data streams | 4h |
| Type of classes - exercises | | |
| Ćw1 | Model design and evaluation | 2h |
| Ćw2 | Linear regression | 2h |
| Ćw3 | Resampling methods | 2h |
| Ćw4 | Classification algororithms | 5h |
| Ćw5 | Dimensionality reduction | 2h |
| Ćw6 | Unsupervised learning | 2h |
| Type of classes - laboratory | | |
| Lab1 | Preparing Data for Mining | 2h |
| Lab2 | Linear regression and related methods | 2h |
| Lab3 | Classification algororithms | 4h |
| Lab4 | Clustering algororithms | 2h |
| Lab5 | Introduction Apache Spark | 5h |

| Applied learning tools |
|---|
| 1. Traditional lecture<br>2. Multimedia lecture<br>3. Solving tasks and problems<br>4. Solving programming tasks<br>5. Creating programming projects<br>6. Self-study students |

| EVALUATION OF THE EFFECTS OF EDUCATION ACHIEVEMENTS | | |
|---|---|---|
| Value | Number of training effect | Way to evaluate the effect of education |
| F1 | W1-W2, K1-K1 | Test |
| F2 | U1-U2, K1-K1 | Activity |
| F3 | U1-U2, K1-K1 | Implementation and presentation of solutions |
| P=40%*F1+30%*F2+30%*F3 | | |

| BASIC AND ADDITIONAL READING |
| --- |
| 1. The Elements of Statistical Learning: Data Mining, Inference, and Prediction, T.Hastie, R. Tibshirani, J.Friedman, 2009<br>2. Mining of Massive Datasets, J.Leskovec, A.Rajaraman, J. Ullman, 2010<br>3. Big Data Analytics with Spark, M. Guller, 2015 |
| SUPERVISOR OF COURSE |
| dr inż. Jakub Lemiesz |

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE
Data Mining
WITH EFFECTS OF EDUCATION ON THE DIRECTION OF COMPUTER SCIENCE

| Course training effect | Reference to the effect of the learning outcomes defined for the field of study and specialization (if applicable) | Objectives of the course** | The contents of the course** | Number of teaching tools** |
|---|---|---|---|---|
| W1 | K2_W01 K2_W02 | C1 | Wy1-Wy9 | 1 2 6 |
| W2 | K2_W02 | C1 | Wy1-Wy9 | 1 2 6 |
| U1 | K2_U03 | C2 C3 | Ćw1-Ćw6<br>Lab1-Lab5 | 3 4 5 6 |
| U2 | K2_U01 K2_U03 K2_U05 K2_U06 | C2 C3 | Ćw1-Ćw6<br>Lab1-Lab5 | 3 4 5 6 |
| K1 | K2_K07 | C1 C2 C3 | Wy1-Wy9<br>Ćw1-Ćw6<br>Lab1-Lab5 | 1 2 3 4 5 6 |