SYLLABUS

Name: ***Applied Statistics (MakAu-DS>SM2AS19F)***
Name in Polish:
Name in English: ***Applied Statistics***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma2.polsl.pl/rau1/course/view.php?id=506

Short description:

During the course, the basic methods of the applied statistical data analysis will be discussed, taking into account the methods of data pre-processing as well as parametric and non-parametric hypothesis testing techniques. The basic tools supporting the analysis of large data sets will also be presented, including methods of p-value correction due to multiple testing and measures of the effect size.

Description:

ECTS: 2
Total workload: 60 hours (30 contact hours, 30 students' work hours)
Forms of contact hours:
Lecture 15h
Laboratory 15h
Students' own work: preparation for classes, statistical analysis of datasets, and preparation of presentation.

Number of ECTS points obtained in classes with direct participation of an academic teacher: 2
Number of ECTS points obtained in practical classes (laboratories, projects): 1
The topics of the lectures are as follows:
1) The methods of statistical inference
2) Missing data imputation
3) Correction for multiple testing
4) Statistics and Big Data
5) P-value integration
During the lectures, elements of the theory are supported by numerous examples of applications in the analysis of real data sets.

As part of the course, students carry out a statistical analysis of a selected dataset, using the methods presented during the lectures in the subsequent stages. During laboratories, student present the results and progress of his work regularly in the form of short presentation.

Bibliography:

1) Douglas C. Montgomery, George C. Runger, Applied Statisticsand Probability for Engineers, Wiely, 2003
2) Feller W: An Introduction to Probability Theory and Its Applications, Vol. 1, Wiley, 3rd edition or later
3) James, Gareth, et al. An introduction to statistical learning. Vol. 112. New York: springer, 2013.
4) Zar JH: Biostatistical Analysis, Prentice Hall, 4rd edition or later

Learning outcomes:

Skills: can
- The student knows different types of variables. Knows basic concepts from descriptive statistics: measures of location, dispersion, symmetry and concentration (K2A_U16, K2A_U18)
- The student can propose analysis pipelines for different data types with the usage of statistical and machine learning methods. (K2A_U16, K2A_U18)
- The student knows problems related to big data and missing data imputation. (K2A_U16, K2A_U18)

Assessment methods and assessment criteria:

According to SUT regulation, lecture attendance is optional (however highly recommended), whereas laboratory exercises are obligatory.

The progress of the dataset analysis is presented during the laboratory and graded (P). Some laboratories have individual tasks to solve and send report (L). Also, at the last laboratory, there is a presentation of the final project (FP). Final grade will be computed using the following formula 0.5*mean(P) + 0.25*mean(L) + 0.25*FP and equals:
• 2 (fail) if <= 39.99
• 3 (dost) if from 40.00% to 49.99%
• 3.5 (pdost) if from 50.00% to 59.99%
• 4 (db) if from 60.00% to 69.99%
• 4.5 (pdb) if from 70.00% to 79.99%
• 5 (bdb) if ≥ 80.00%

The syllabus is valid from the academic year 2024/25 and its content cannot be changed during the semester.

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2020/2021-Z	