SYLLABUS

Name: ***Statystyka w analizie danych (IB-IMSI>SI3SAD23S)***
Name in Polish:
Name in English: ***Statistics in Data Analysis***

Information on course:

Course offered by department: Faculty of Biomedical Engineering
Course for department: Silesian University of Technology
Term: Winter semester 2024/2025
Cordinator of course edition: Dr inż. Zuzanna Miodońska

Default type of course examination report:

ZAL

Language:

Polish

Short description:

Learning the basic concepts and methods of mathematical statistics in medical applications.

Description:

The subject includes 15 hours of lecture and 15 hours of laboratory. The subject is assigned 3 ECTS points. Laboratory classes are mandatory. These classes are held remotely during the period of increased health protection (especially during the pandemic threat) or in the stationary system in the absence of restrictions recommended by the relevant authorities. Remote learning is carried out through virtual meetings using the Moodle Platform. A student taking part in the classes should be prepared on the basis of lecture materials and laboratory instructions available on the Platform.

The program content presented in the lecture is as follows:

1. Definition of probability. Definition of a random variable, examples. Descriptive statistics.

2. Distributions of random variables.

3. Estimators of parameters of the distribution of a random variable. Confidence intervals.

4. Construction of a statistical test. Type I and II errors. Power of the test and effect size.

5. Parametric tests of significance.

6. Analysis of variance. Post-hoc tests.

7. Correlation analysis.

8. Nonparametric tests. Problems encountered in data acquisition and statistical analysis.

The laboratory is conducted in the R language, using the free RStudio software.

The program content that is the subject of the laboratory classes is:

1. Basics of the R package. Importing data to the RStudio program. Familiarization with the types of variables in R. Creating variables. Presentation of basic commands in R. Introduction of conditional statements and loops in R.

2. Generating graphs in R.

3. Descriptive statistics. Confidence intervals. Fitting distributions.

4. Parametric tests of significance (Student's t-tests).

5. Analysis of variance.

6. Nonparametric tests of significance. Correlation analysis.

Bibliography:

Moczko, Brębowicz, Tadeusiewicz: Statystyka w badaniach medycznych. PWN 1998

Greń: Statystyka matematyczna – modele I zadania. PWN, Warszawa 1982

Zieliński: Dobór próby w badaniach epidemiologicznych. PRZEGL EPIDEMIOL 2002, 56:489-498

Learning outcomes:

1. Has the necessary knowledge in the field of medical statistics. K1A_W03

2. Knows the basic methods of analyzing collected biomedical data. Knows how to build simple stochastic models and select variables for them. K1A_W03

3. Understands the difference between an interpretable and uninterpretable result. K1A_W02

4. Is able to select and use appropriate software to perform statistical data analyses concerning engineering issues. K1A_U23

5. Is able to draw correct conclusions from the obtained results of statistical tests, interpreting them logically. K1A_U02

6. Is able to prepare, conduct and interpret a statistical test. K1A_U03

7. Is able to use knowledge of mathematical statistics to interpret medical and biomedical phenomena. K1A_U15

8. Has the ability to use basic statistical methods to analyze and describe data of an engineering nature. K1A_U16

Assessment methods and assessment criteria:

A grade of at least 3.0 is required for each lab subject to assessment, as well as passing each lab not subject to assessment.

A student has the right to repeat one lab from which he did not receive a pass (labs not subject to assessment) or one lab from which he did not receive a grade of 3.0 or higher (labs subject to assessment).

The final grade is the average grade from the lab (calculated from the classes subject to assessment).

Practical placement:

not applicable

Information on course edition:

Default type of course examination report:

ZAL

Bibliography:

missing bibliography in English

Details of classes and study groups

lecture (15 hours)

Study groups details

Group number 1

Class instructors:

Dr inż. Zuzanna Miodońska

laboratory classes (15 hours)

Study groups details

Group number 1

Class instructors:

mgr inż. Anna Slian

Group number 2

Class instructors:

mgr inż. Anna Slian

Element of course groups in various terms:

Course group description	First term	Last term
missing group description in English (IB-IMSI>SI-3-23-S)	2024/2025-Z	

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	3	2024/2025-Z	