

SCHEDULE OF EXERCISES FOR THE COURSE
"BIOSTATISTICS"
 FOR 2ND-YEAR MEDICAL STUDENTS

Topic	Date/groups
Introduction to Biomedical Statistics. Descriptive Statistics.	09.11. (Mon.)/4 10.11. (Tue.)/7, 5, 3, 10 12.11. (Thu.)/1, 6, 13, 11 13.11. (Fri.)/2, 9 19.11. (Thu.)/12, 8
Sample distribution and normal distribution. Hypothesis testing: Part 1 – parametric tests.	16.11. (Mon.)/4 17.11. (Tue.)/7, 5, 3, 10 18.11. (Wed.)/1, 6, 13, 11 20.11. (Fri.)/2, 9 26.11. (Thu.)/12, 8
Hypothesis Testing: Part 2 – Non-parametric Tests. Correlations and Linear Regression.	23.11. (Mon.)/4 24.11. (Tue.)/7, 5, 3, 10 25.11. (Wed.)/1, 6, 13, 11 27.12. (Fri.)/2, 9 03.12. (Thu.)/12, 8

The exercises take place in Room C on the ground floor at 24 Karłowicza Street.

Teachers:

Dr hab. Celestyna Mila-Kierzenkowska, prof. UMK, dr hab. Karolina Szewczyk-Golec, prof. UMK, dr Marta Pawłowska, dr Roland Wesołowski, dr Joanna Wróblewska, dr P. Sutkowy, dr Jarosław Nuskiewicz

Basic literature:

1. Wayne W. Daniel and Chad W. Cross: Biostatistics: a foundation for analysis in the health sciences. John Wiley & Sons, Ltd., cop. 2009.

Supplementary literature:

1. A. Källén: Understanding biostatistics. John Wiley & Sons, Ltd., cop. 2011.
 2. Marc M. Triola, Mario F. Triola: Biostatistics for the biological and health sciences. Pearson/Addison Wesley, cop. 2006.

Tutorial 1. Introduction to biomedical statistics. Descriptive statistics. During the first session, the student will be introduced to fundamental statistical concepts: population, sample, variable, qualitative variables, quantitative variables, variable scales (nominal, ordinal, interval), probability, frequency, ratio, proportion, and percentage. The student will learn the theory behind key descriptive statistics and how to apply them in practice. They will also learn about the most commonly used measures of central tendency and dispersion

(specifically: arithmetic mean and median; variance, standard deviation, and coefficient of variation).

Tutorial 2. Sampling distribution and normal distribution. Hypothesis testing: Part 1 – parametric tests. During the second session, the student will learn the theory of sampling distributions and normal distributions and how to perform statistical analysis on research data. They will explore the practical application of parametric tests and learn to verify their underlying assumptions: the Kolmogorov-Smirnov test and Shapiro-Wilk test, Student's t-test for dependent and independent samples, Levene's test, and ANOVA (including post-hoc analysis).

Tutorial 3. Hypothesis testing: Part 2 – non-parametric tests. Correlation and linear regression. During the final session, the student will learn to use non-parametric tests—employed when the assumptions for parametric tests are not met—such as the Wilcoxon test, Mann-Whitney U test, and Kruskal-Wallis H test (with post-hoc analysis). This session will also cover the theory of linear regression and correlation, introducing the student to Pearson and Spearman correlation coefficients and how to calculate them. The student will also learn to graphically represent linear regression results using a spreadsheet and statistical software.