Faculty of Biology and Biotechnology

Course title: STATISTICS IN BIOLOGY

ECTS credit allocation (and other scores): 2

Semester: summer

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 h.

Course coordinator/ Department and e-mail: Jacek J. Nowakowski; Department of Botany and Evolutionary Ecology; jacek.nowakowski@uwm.edu.pl

Type of classes: classes (computer laboratory) and lectures

Substantive content

CLASSES: (Computer laboratory). Parametric and nonparametric analysis - assumptions for analysis. General linear models Analysis of variance – one way ANOVA, factorial and main effects ANOVA, repeated-measures ANOVA models. Post hoc tests. Alternative nonparametric tests. Regression analysis - simple regression, multiple regression, nonlinear regression. Principles of presenting data analysis results.

LECTURES: Inductive statistics – hypothesis testing – estimators and estimation error – distributions of a random variable – central limit theorem. General Linear Models- theoretical introduction (ANOVA, ANCOVA, MANOVA, MANCOVA). Model classifications and alternative nonparametric tests. Post hoc tests. Correlation analysis and general regression models – theoretical introduction.

LEARNING PURPOSE: Learning the advanced theoretical bases of statistical analysis and mastering linear and nonlinear analysis of data using Statistica or SPSS program.

On completion of the study programme the graduate will gain:

KNOWLEDGE: student knows and understands the theoretical basis of linear and nonlinear analysis (variance analysis and regression analysis in various experimental designs) and the analysis of relationships between quantitative variables.

SKILLS: the student analyzes data using appropriately selected methods of statistical analysis and can use Statistica or SPSS software.

SOCIAL COMPETENCIES: Respect the principles of formal inference in scientific research.

Basic literature: 1.) *TIBCO Software Inc. (2020). Data Science Textbook.* https://docs.tibco.com/data-science/textbook.

Supplementary literature: 1.) Sokal R.R., Rolf F.J., Biometry, W H. Freeman and Co., NewYork, 1995.

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 32 h.

Student's independent work: 18 h.