University of Gdańsk

# Subject card

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|---|---|---|---|
| Subject name and code | Statistics with elements of mathematics in biological sciences, PG_00198108 | | |
| Field of study | Natural Resources Conservation | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | 2027/2028 |
| Education level | Bachelor's studies | Subject group | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 3 | ECTS credits | 2.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Laboratory of Plant Physiology and Toxicology -> Department of Experimental Biology and Plant Biotechnology -> Faculty of Biology -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Agnieszka Baścik-Remisiewicz | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 30 | 4.0 | 16.0 | 50 |

**Subject objectives**

1. To prepare students to use basic methods of statistical analysis and to apply them in the interpretation of biological phenomena and processes.

2. To acquaint students with the tools of mathematics necessary to understand the laws of nature and to describe life processes.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OZPL3_W12] The graduate possesses knowledge of statistical methods and IT tools relevant to the field of study. | The graduate has knowledge of the use of statistical methods in the field related to the field of study. | [SW4] test/exam - oral or written |
| [OZPL3_W08] The graduate possesses advanced knowledge and understanding of data analysis tools required to comprehend natural laws and describe biological processes | The graduate know and understand the tools of mathematics and statistics necessary to understand the laws of nature and to describe biological processes. | [SW4] test/exam - oral or written |
| [OZPL3_U05] The graduate is able to apply basic statistical methods and computer techniques and tools to describe phenomena and analyse biological data | The graduate is able to apply basic statistical and mathematical methods to describe phenomena and analysis of biological data. | [SU4] test/exam - oral or written |
| [OZPL3_K01] The graduate is ready to recognise the limitations in his/her own knowledge and understands the need for continuous learning and development | The graduate is ready to recognise the imitations in his/her own knowledge and understand the need for continuous learning and development. | [SK8] observation of student's independent or team work |

<table>
<tr><td>Subject contents</td><td>Statistics: Basic concepts of statistics (types of variables, types of scales, rules for approximating numbers, histograms). Descriptive statistics: samples size, arithmetic, geometric and harmonic mean, variance, standard deviation, coefficient of variation, standard error, median and modal value, skewness, confidence interval. Binomial and normal distributions. Statistical hypothesis testing. Homogeneity of variance (Snedecor's F test). Student's t-test. One-way analysis of variance and Kruskal-Wallis test. The chi-square test. Selected non-parametric tests. Correlation and simple regression.<br><br>Mathematics: Introduction to the calculus of probability. Number sequences and series. Derivative of a function and its application. Integral calculus of functions of one variable: the indeterminate and determinate integral, methods of calculating integrals and their application. Real and imaginary numbers. Actions on matrices.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written test</td><td>51.0%</td><td>100.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Baścik-Remisiewicz A., Chincinska I., Miklaszewska M. 2020. Wybrane zagadnienia ze statystyki i matematyki. Przewodnik do ćwiczeń dla studentów biologii. Wydawnictwo Uniwersytetu Gdańskiego<br><br>Łomnicki A. 2014. (lub wydania wcześniejsze). Wprowadzenie do statystyki dla przyrodników. PWN, Warszawa.<br><br>Krysicki W., Włodarski L. 2015. (lub wydania wcześniejsze). Analiza matematyczna w zadaniach. Część I i II. PWN, Warszawa.</td></tr>
<tr><td>Supplementary literature</td><td>Wrzosek D. 2010. (lub wydania wcześniejsze). Matematyka dla biologów. Wydawnictwo Uniwersytetu Warszawskiego.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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