University of Gdańsk

Subject card

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| Subject name and code | Research planning and data analysis in biological oceanography I, PG_00044097 | | | | | | |
| Field of study | Oceanography | | | | | | |
| Date of commencement of studies | October 2024 | | Academic year of realisation of subject | 2024/2025 | | | |
| Education level | postgraduate studies | | Subject group | Obligatory subject group in the field of study | | | |
| Mode of study | full-time studies | | Mode of delivery | at the university | | | |
| Year of study | 1 | | Language of instruction | Polish | | | |
| Semester of study | 1 | | ECTS credits | 3.0 | | | |
| Learning profile | academic | | Assessment form | | | | |
| Conducting unit | Katedra Funkcjonowania Ekosystemów Morskich -> Faculty of Oceanography and Geography | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Ludmiła Sromek | | | | | |
| | Teachers | dr Ludmiła Sromek<br>dr Anna Toruńska-Sitarz<br>dr Anna Dziubińska | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 0.0 | 0.0 | 45.0 | 0.0 | 0.0 | 45 |
| | 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 | 45 | | 5.0 | 25.0 | 75 | |
| Subject objectives | Develop knowledge of the principles of environmental, laboratory and in silico experiment planning and data analysis in the field of biological oceanography. | | | | | | |

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [OCEANMU2-K03] is ready to effectively organize his/her own work,<br>is active and persistent<br>and punctuality in completing tasks, is ready to<br>carrying out evaluation of their own activities | the student is ready to plan, implement and supervise, individually<br>or in a team, subsequent stages of the assigned task related to biological oceanography, he is willing to take responsibility for the organization and results of his work | [SK8] observation of student's independent or team work |
| [OCEANMU2-U06] can use specialized computer software and advanced mathematical and statistical methods in data analysis and description of processes and phenomena occurring in the marine environment and coastal zone | the student can independently use specialized software for data analysis and advanced statistical methods to describe processes occuring in the marine environment and coastal zone in relation to biological oceanography | [SU4] test/exam - oral or written<br>[SU6] demonstration of practical skills |
| [OCEANMU2-U03] can plan and carry out independently advanced research and measurements, both in field and laboratory, using appropriately selected measurement and analytical techniques in the field of oceanography, adequately to the studied specialty and research problem | the student is able to independently plan and analyze data from the scope of biological oceanography using appropriately selected<br>mathematical and statistical tools, adequate to the studied specialty and the considered research problem | [SU2] presentation/project/paper/ report<br>[SU4] test/exam - oral or written<br>[SU5] implementation of a problem task |
| [OCEANMU2-U04] is ready to develop in an analytical and synthetic way<br>research and analysis results and based on them creating conclusions | the student is able to lay down and interpret the results of research and analyzes in the field of biological oceanography and draw correct conclusions on this basis | [SU4] test/exam - oral or written<br>[SU6] demonstration of practical skills |
| [OCEANMU2-W09] knows and understands legal regulations regarding intellectual property rights and their application in scientific work | the student knows and understands legal regulations regarding intellectual property rights and their application in the scientific work of a biological oceanographer | [SW3] text preparation/written work |
| [OCEANMU2-W05] knows and understands the principles of planning and conducting field and laboratory research as well as advanced methods and tools of scientific research, especially in the field of the studied specialty | the student knows and understand in-depth the principles of planning and conducting environmental and laboratory experiments and advanced methods of data analysis in the field of biological oceanography | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |

**Subject contents**

- Principles of planning experimental and theoretical research, building a research hypothesis. Data management plan.
- Types of errors, distribution of random variables.
- Parametric and non-parametric statistics in the analysis of the difference in means and linear regression between variables.

**Prerequisites and co-requisites**

Basic knowledge of mathematics and statistics

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| (mid-term / end-term) test | 51.0% | 67.0% |
| assignment work – project or presentation | 51.0% | 20.0% |
| assignment work – completing a specific practical assignment | 51.0% | 13.0% |

**Recommended reading**

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| Basic literature | Łomnicki A., 1995, Wprowadzenie do statystyki dla przyrodników. Wydawnictwo Naukowe PWN, Warszawa, 245 pp. (in Polish)<br>Greń J., 1978, Statystyka matematyczna modele i zadania. Państwowe Wydawnictwo Naukowe, Warszawa, 363 pp. (in Polish)<br>Sokal R.R., Rohlf F.J., 1998, Biometry. W.H. Freeman and Company, New York, 887 pp. |
| Supplementary literature | Kala R., 2005, Statystyka dla przyrodników. Wydawnictwo Akademii Rolniczej w Poznaniu, Poznań, 232 pp. (in Polish) |
| eResources addresses | Adresy na platformie eNauczanie: |

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| Example issues/ example questions/ tasks being completed | • Principles of research planning. Data management plan.<br>• Description of research results using location and variability measures. Graphical representation of data. Independence and randomness of the sample. Distribution of sample means, confidence intervals, standard error<br>• Formulation and verification of statistical hypotheses. Significance level, rejection region, probability of type I and II error<br>• Principles of selecting statistical tests. Assumptions, testing of normality of sample distribution<br>• Tests for differences between means.<br>• Variance analysis<br>• Nonparametric tests for differences between samples.<br>• Correlation and regression |
| Work placement | Not applicable |

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