University of Gdańsk

Subject card

Subject name and code	Research Planning and Data Analysis in Biological Oceanography I - laboratory , PG_00206194		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2027/2028
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Marine Ecosystems Functioning -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Ludmiła Sromek	
	Teachers		

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	3.0	27.0	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-U06] is able to use specialized computer software as well as advanced mathematical and statistical methods to analyze data and describe processes and phenomena occurring in the marine and coastal environment; evaluates their reliability and usefulness and performs critical analysis	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 [SU6] demonstration of practical skills
[OCEANMU2-U04] is ready to develop in an analytical and synthetic way 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 [SU6] demonstration of practical skills
[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 [SW2] presentation/project/paper/ report
[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 mathematical and statistical tools, adequate to the studied specialty and the considered research problem	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task
[OCEANMU2-K03] is ready to effectively organize his/her own work, is active and persistent and punctuality in completing tasks, is ready to carrying out evaluation of their own activities	the student is ready to plan, implement and supervise, individually 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-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

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
assignment work – completing a specific practical assignment	51.0%	13.0%
assignment work – project or presentation	51.0%	20.0%
(mid-term / end-term) test	51.0%	67.0%

Recommended reading

Basic literature	Łomnicki A., 1995, Wprowadzenie do statystyki dla przyrodników. Wydawnictwo Naukowe PWN, Warszawa, 245 pp. (in Polish) Greń J., 1978, Statystyka matematyczna modele i zadania. Państwowe Wydawnictwo Naukowe, Warszawa, 363 pp. (in Polish) 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	

Example issues/ example questions/ tasks being completed	• Principles of research planning. Data management plan. • 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 • Formulation and verification of statistical hypotheses. Significance level, rejection region, probability of type I and II error • Principles of selecting statistical tests. Assumptions, testing of normality of sample distribution • Tests for differences between means. • Variance analysis • Nonparametric tests for differences between samples. • Correlation and regression
Work placement	Not applicable

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