Subject card

Subject name and code	Inference and classification in data analysis, PG_00044133
Field of study	Mathematics

Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Zakład Równań Różniczkowych i Zastosowań Matematyki -> Instytut Matematyki Stosowanej -> Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	mgr inż. Katarzyna Tessmer
	Teachers	mgr inż. Katarzyna Tessmer

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	15.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	To teach analysis of observed data with respect to their structure, model and randomness and to teach algorithms of the statistical decision scheme. To teach using the appropriate statistical algorythms and getting the correct interpretation. To teach statistical methods of data clasiffication, methods of their evaluation and getting the correct interpretation.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W08	Students know the mathematical foundations of statistical algorithms. Students know basic statistical methods implemented in R and data analysis and visualisation methods.	[SW3] Assessment of knowledge contained in written work and projects
	K6_W05	Students know the examples of selected mathematical and statistical notions as well as the examples of applications of given methods and algorithms.	[SW1] Assessment of factual knowledge
	K6_U11	Students are capable to analyse the data with respect to their structure, randomness and the applicable statistical algorithm(s). Students are capable to exploit the appropriate algorithm and correcly interpret the results. Students determine the parameter estimators of discrete and continuous probability distributions. Students use the test statistic probability distribution. Students apply central limit theorem to determine the test statistic distribution.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	K6_K01	Students know how to extend their knowledge in the statistical data analysis and data classification and grouping methods by using the existing and appearing literature - the handbooks as well as the new bibliography.	[SK5] Assessment of ability to solve problems that arise in practice
	K6_U12	Students are capable to analyse the data with respect to their structure, randomness and the applicable statistical algorithm(s). Students are capable to exploit the appropriate algorithm and correcly interpret the results. Students demonstrate the ability to present mathematical issues and analysis results to the wider audience.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents	Inference (hypothesis verification) in data analysis: one-sample Student's t-test, two-sample Student's t-test, chi-squared test for variance, F-test, Pearson's chi-squared test, chi-square test of independence. Classification in data analysis: one-way analysis of variance, two-way-analysis of variance.
Prerequisites and co-requisites	Courses completed: Probability Calculus.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Projects	50.0%	30.0%
	Colloquiums	50.0%	70.0%

Recommended reading	Basic literature	W. Kordecki, Rachunek prawdopodobieństwa i statystyka matematyczna. Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław, 2010.
		H. Jasiulewicz, W. Kordecki, Rachunek prawdopodobieństwa i statystyka matematyczna. Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław, 2003.
		J. Greń, Statystyka matematyczna. Modele i zadania, PWN, Warszawa, 1982.
		M. Gągolewski, Programowanie w języku R, PWN, Warszawa, 2016.
		P. Biecek, Przewodnik po pakiecie R, Oficyna Wydawnicza GiS, Wrocław, 2017.
	Supplementary literature	L. Gajek, M. Kałuszka, Wnioskowanie statystyczne, Wydawnictwa Naukowo-Techniczne, Warszawa, 1996.

	eResources addresses	Podstawowe
		https://han.bg.pg.edu.pl/han/ibuk-libra/https/libra.ibuk.pl/reader/programowanie-w-jezyku-r-marek-gagolewski-104240 - M. Gągolewski, Programowanie w języku R, PWN, Warszawa, 2016 (accessed 25th February 2024).
		Adresy na platformie eNauczanie:
		Wnioskowanie i klasyfikacja w analizie danych 2023/2024 - Moodle ID: 37675 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37675
Example issues/ example questions/ tasks being completed	On exercises students solve problems which are provided by the lecturer, while others give their comments and suggest improvements.	
Work placement	Not applicable	