



## Subject card

Subject name and code	Statistics and data analysis, PG_00061705						
Field of study	Recycling and Energy Recovery						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	first-cycle 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	2		Language of instruction		English		
Semester of study	3		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department Of Geotechnical And Hydraulic Engineering -> Faculty Of Civil And Environmental Engineering - > Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Wojciech Artichowicz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	20.0	20.0	0.0	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		10.0		80.0	150
Subject objectives	<p>The aim of the subject is to teach students the basics of statistics, and its practical utilization. During lectures the teorethical background of statistical methods is presented, whereas dirong tutorials practical exercises are performed. The focus of the practice is engineering, business and scientific activity. At the course attendees gain:</p> <ul style="list-style-type: none"><li>• Basics of statistics and probability theory</li><li>• Basic skills of working with data</li><li>• Basic skills of data science tools: Libre Office Calc, Tableau®, Python, Jupyter Notebook</li><li>• Awareness of existence of data science community, f.e.: Kaggle</li></ul>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U01] applies knowledge of mathematics and other exact sciences and engineering disciplines to solve theoretical, engineering and technological problems and issues.	Is able to apply knowledge of statistics to analyze data and compare two or more groups.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K6_U06] uses information technology to improve data analysis and design support.	Knows and is able to choose tools appropriate to conduct statistical analysis of data.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K6_W01] demonstrates knowledge and understanding of mathematics and other exact sciences and engineering disciplines at the level necessary to solve theoretical, engineering and technological problems and issues.	Is able to apply knowledge of statistics to analyze data and compare two or more groups.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W02] analyzes engineering and technological issues and problems in the area of raw materials and energy recovery using appropriate and appropriate analytical, numerical and experimental tools and methods	Is able to determine the possibility of using data analysis and statistics tools to solve problems in the field of raw materials and energy recovery.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	<b>Lectures and tutorials</b>  1.Introduction (what is statistics, how do engineers, medicians, biologists use it, tools used for statistical computing)  2. Probability (definitions, interpretations and approaches of computing), combinatorical computation of probability  3. Conditional probability, totla probability, Bayes theorem  4. Random variable (discrete and continuous), examples of random variables (f.e. normal distribution)  5. Sample collection methods and design of experiments  6. Descriptive statistics and graphical data exploration  7. Estimation theory (maximum likelihood method, least squares method, etc.), point and interval estimation  8. Statistical inference, confidence intervals  9. Statistical hypotheses testing, parametric hypostheses, nonparametric hypotheses  10. Pseudo random number generators, permutation tests, bootstrap estimation  11 Regression and correlation  12. ANOVA  13 Regression and correlation - advanced approach  14. Data analysis  15. Machine learning  16. End test  <b>Workshops:</b> 1. Data anlysis with Tableau 2. Introduction to Jupyter Notebook for statistical computing		
Prerequisites and co-requisites	Basics of advanced mathematics: algebra and calculus  Basic computer skills.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	End test	60.0%	70.0%
	Project (datase analysis)	80.0%	30.0%

Recommended reading	Basic literature	<p>Jay L. Devore, Probability and Statistics for Engineering and the Sciences. 8th edition.</p> <p>Norman Lloyd Johnson, Statistics and experimental design in engineering and the physical sciences.</p> <p>"An Introduction to statistical Learning Theory With Applications in Python" G. James, D. Witten, T. Hastie, R. Tibirishani, J. Taylor. <a href="#">Link to pdf</a></p>
	Supplementary literature	<p><a href="#">SciPy Stats documentation</a>.</p> <p><a href="#">scikit-learn library documentation</a>.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.