



Subject card

Subject name and code	Statistical analysis in production management (engineering), PG_00059487						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study 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	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Technologii Materiałów Konstrukcyjnych i Spajania -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dariusz Fydrych					
	Teachers	dr hab. inż. Dariusz Fydrych dr inż. Gabriel Strugała					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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	6.0	24.0	75		
Subject objectives	The aim of the course is to familiarize students with statistical techniques used in production management						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_K01] is aware of the need to expand knowledge and verify the methods of solving problems by consulting experts	The student is active in acquiring knowledge			[SK4] Assessment of communication skills, including language correctness		
	[K7_W02] has extended knowledge covering key issues characterizing production processes	Student classifies production processes			[SW1] Assessment of factual knowledge		
	[K7_U04] is able to plan and carry out experiments, including measurements and computer simulations, interpret the obtained results and extract conclusions; can use analytical, simulation and experimental methods to formulate and solve engineering tasks	The student is able to use statistical techniques			[SU4] Assessment of ability to use methods and tools		
	[K7_K05] is able to integrate the possessed knowledge from various scientific disciplines, and in the innovative implementation of engineering tasks also take into account system and non-technical aspects, including ethical ones	The student is able to acquire and use multidisciplinary knowledge.			[SK3] Assessment of ability to organize work		

Subject contents	Lecture:Basic concepts of statistics. Statistical model. Data mining. Taxonomy.Statistical analysis as a production optimization tool. The role of statistical methods in production engineering.Statistical software: Statistica, R, SPSS, Statgraphics, MS Excel. Principles of data preparation for statistical analyses.Basic statistics: measures of position and spread.Regression analysis: simple regression, multiple regression, factorial regression, polynomial regression, response surface regression.Logistic regression.Dimension reduction methods. Correspondence analysis. Factor analysis. Principal component analysis.Cluster analysis. Classification trees.Industrial statistics: experiment planning.Graphical methods of presenting multidimensional data: star plots, Chernoff faces, matrix plots, frame-whisker plots.Case study: machining, welding, other manufacturing processes Project:Development of a solution to a given multidimensional problem in the field of basic manufacturing techniques.Laboratory:Getting acquainted with the use of statistical programs (e.g. Statistica). Preparation of data for analysis.Task solution:Verification of the fit of the data to the normal distribution: the Shapiro-Wilk testSimple regressionMultiple regressionCluster analysisCorrespondence analysisLinear ordering		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	60.0%	20.0%
	Project	60.0%	20.0%
	Test	60.0%	60.0%
Recommended reading	Basic literature	Stanisz, A. (2006). <i>Przystępny kurs statystyki z zastosowaniem STATISTICA PL. Wyd. StatSoft, Kraków.</i>  Dobosz, M. (2004). <i>Wspomagana komputerowo statystyczna analiza wyników badań.</i> Akademicka Oficyna Wydawnicza EXIT.	
	Supplementary literature	Kot, S., Jakubowski, J., & Sokołowski, A. (2007). <i>Statystyka: podręcznik dla studiów ekonomicznych.</i> Centrum Doradztwa i Informacji Difin.	
	eResources addresses	Adresy na platformie eNauczanie: Analiza ststystyczna w zarządzaniu produkcją, Zarządzanie i inżynieria produkcji, II stopnia, sem. 1, 2022/2023 - Moodle ID: 29482 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29482">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29482</a>	
Example issues/ example questions/ tasks being completed	Calculate the indicated measures of position and dispersion for the given dataset.Discuss the principles of experiment planning.Describe the idea of dimension reduction methods.		
Work placement	Not applicable		