Course code	
Type and description	Elective Course
ECTS credit	1
Course name	Statistical optimisation of industrial processes
Course name in Polish	Optymalizacja statystyczna procesów przemysłowych
Language of instruction	English
Course level	8 PRK
Course coordinator	Dr hab. inż. Tomasz Ganicz
Course instructors	Dr hab. inż. Tomasz Ganicz

Delivery methods and course duration

	Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester
Contact hours	0	0	0	15	0	0	15
E-learning	No	No	No	No	No	No	
Assessment criteria (weightage)	0,00	0	0	100%	0	0,00	

Course objective

1. Acquiring knowledge about basic concepts of statistical modelling of industrial processes – statistical factor tests, correlation and regression of statistical data sets, time series forecasting, limitations of statistical methods.
2. Acquire the ability to select appropriate statistical methods for solving optimization problems.
3. Acquire the ability to solve problems based on statistical models using examples of processes in the paper industry.

Learning outcomes

Having completed the course student:

1. Understands the theoretical basis of selected statistical methods: structure of statistical tests, selection of correlation functions, forecasting based on time series; W4, U4, K1
2. Is able to select appropriate statistical methods to investigate and solve industrial problems and understand their limitations ; W4, K1
3. Is able to practically apply appropriate statistical methods to build models of industrial processes and draw correct conclusions from them ; U4, K1

Assessment methods

U4, K1 – project seminar presentation
W4, U4, U2 – written project
The final grade
Presentation - 25%
Project evaluation– 75%

Prerequisites

Course content with delivery methods

SEMINAR
1. The basics of statistics: Definition of data set, basic descriptive statistical functions and how calculate them using RealStat for Excel.
2. Statistical tests structure and examples: Student and ANOVA test
3. Correlation, regression and their limitations
4. Time series and its components, forecasting and its limitation, smoothing modelling
5. Introduction to optimisation models' solving: linear and non-linear
PROJECT
6. Presentation of solutions to selected optimisation problems and their discussion.

Basic reference materials	1. W. Navidi, Statistics for Engineers and Scientists, 5th edition, McGraw-Hill Education, New York, 2019 2. D.C. Montogomery, C.L. Jenings, M. Kulahci, Introduction to Time Series and Forecasting, Willey & Sons, 2015. 3. G. Smook, Handbook For Pulp and Paper Technologists, 4th edition, TAPPI Press, 2016.
Other reference materials	Charles Zionitz, Real Statistics resource pack website [on line], URI: https://www.real-statistics.com/
Average student workload outside classroom	10h
Comments	
Last update	27.04.2023