



Subject card

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| 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 | | |

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| 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). Przystępny kurs statystyki z zastosowaniem STATISTICA PL. <i>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 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29482 | |
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| 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 | | |