COURSE DESCRIPTION CARD - SYLLABUS

Course name
Advanced technologies in pro-quality data analysis [N1IBiJ1>ZTwADP]

Course

Field of study
Safety and Quality Engineering

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
18

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of technical issues, statistics and work organization

Course objective

Acquiring the ability to select and use modern solutions to improve the execution of tasks related to ensuring, supervising and controlling the quality of products and services.

Course-related learning outcomes

Knowledge:
The student:
1. Defines advanced technologies and their application in quality control automation, big data analytics, internet of things, and vision and artificial intelligence systems in the context of quality surveillance and control. [K1_W02]
2. Explains how advanced technologies for pro-quality data analysis can contribute to the identification,

analysis and estimation of risk in the context of quality and occupational safety. [K1_W03]
3. Describes the application of artificial intelligence and vision systems in the life cycle of technical products, equipment and systems, with a focus on improving quality and safety. [K1_W06]

Skills:
The student:
1. Analyses examples of the use of advanced technology in quality control, using matching sources of information to assess their impact on the quality of products and processes. [K1_U01]
2. Projects and optimises control processes, utilising advanced technologies such as artificial intelligence and internet of things to increase quality and security. [K1_U06]
3. Present the results of the use of advanced technologies in the analysis of the data of the qualities, using properly matched means of transmission to present their importance for security engineering. [K1_U09]
4. Identifies needs to supplement knowledge in advanced technologies for pro-quality data analysis, planning for self-directed learning to adapt to changing requirements and technological advances. [K1_U12]

Social competences:
The student:
1. Analyses the cause-effect relationships of implementing advanced technologies in pro-quality data analysis, applying critical appraisal and prioritisation to optimise decision-making in the context of quality and safety. [K1_K01]
2. Develops an awareness of the importance of continuous improvement in advanced technologies for pro-quality data analysis, seeking expert opinion and new sources of knowledge to respond effectively to challenges in safety and quality engineering. [K1_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
ongoing assessment of the tasks performed. For each task the student receives the number of points specified in the conditions for passing the task. It is possible to complete the task with a minimum of 51% of the points.
Summative assessment:
each task must be passed for a minimum of 51%, the sum of points obtained for each task is converted into a grade. The grade is entered according to the following rules: 96 - 100 points - Very Good; 84 - 95 points - Good plus; 73 - 83 points - Good; 61 - 72 points - Sufficient plus; 51- 60 points - Fair; 00 - 50 points - Insufficient.

Programme content

The program content includes topics related to the application of modern solutions to improve the execution of tasks associated with ensuring, supervising, and controlling the quality of products and services.

Course topics

Analysis of the following use cases in practice: automation of quality control, big data analytics in relation to product and process quality, the internet of things in quality monitoring and control, vision systems and artificial intelligence in quality control.

Teaching methods

simulation tasks in the Smart Factory laboratory, tasks with case studies obtained during study visits to Industry 4.0 production facilities.

Bibliography

Basic:
Hamrol A., Zarządzanie i inżynieria jakości : ze spojrzeniem w rzeczywistość 4.0. Wydawnictwo Naukowe PWN, Warszawa 2023.
Skrzypek E., Skrzypek A., Jakość 4.0 w warunkach czwartej rewolucji przemysłowej. Wydawnictwo UMCS,

Lublin 2023.

Additional:
Prussak W., Jasiulewicz-Kaczmarek M., Elementy inżynierii systemów zarządzania jakością. Wydawnictwo Politechniki Poznańskiej, Poznań 2010 .
Sałaciński T.: Inżynieria jakości w technikach wytwarzania. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2016.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	18	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	32	1,50