



Subject card

Subject name and code	Computer-aided statistical process control, PG_00055067						
Field of study	Management and Production Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024				
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	3	Language of instruction	Polish				
Semester of study	5	ECTS credits	2.0				
Learning profile	general academic profile	Assessment form	assessment				
Conducting unit	Zakład Technologii Maszyn i Automatykacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksandra Wiśniewska					
	Teachers	mgr inż. Karolina Chodnicka-Wszelak dr inż. Sławomir Szymański dr inż. Aleksandra Wiśniewska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	4.0	16.0	50		
Subject objectives	The aim of the course is to provide the student with knowledge of the efficient functioning of the product and service quality management system based on statistical process control.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U10] " using appropriate techniques and methods, measuring tools, is able to plan, prepare and carry out the measurement of geometrical specifications of products and conduct a critical analysis of the results	The student knows the rules and tools of workshop metrology. The student is able to make measurements and calculations and interpret the obtained measurement results.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	The student is able to plan the implementation of tasks and is ready to learn how to function and use new methods and tools needed to perform a task in the field of production engineering.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	[K6_W08] has basic management knowledge, including process and product quality management, and detailed knowledge of integrated and standardized quality, environmental, health and safety management systems	The student uses the knowledge of system management to identify opportunities and threats, identify the level of risk and build risk management systems in the area of quality and safety.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_U08] can assess the usefulness of routine methods and tools for solving practical production tasks in measuring in order to supervise processes and analyze the functioning of production systems	The student is able to evaluate the methods and tools used and choose the methods and tools that allow to achieve the expected results in full.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K6_U04] is able to develop documentation in the area of preparation, implementation and control of production processes in Polish and in a foreign language considered basic for scientific fields, is able to identify and formulate the basic objectives of quality management in the product life cycle, is able to use information and communication techniques appropriate to the implementation of tasks typical in engineering activities including preparation, production and supervision of the manufacturing process	The student is able to develop reports, procedures and instructions using the principles of standardization and visualization and in accordance with the principles, methods and tools of information and communication. At the same time, the student operates freely technical and industry vocabulary in the areas of the analyzed problems, speaking freely in Polish and English.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K6_K02] is able to interact and work in a group, assuming different roles, can inspire and organize the learning process of others, properly identifies priorities for realization of a task specified by themselves or others	The student is able to organize work on solving engineering problems. The student is able to distribute tasks and supports the process of carrying out these tasks by preparing practical and theoretical tools increasing the efficiency of the team's work.	[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
	[K6_W12] has detailed, theoretically founded knowledge of methods and techniques used in production quality control processes, statistical process control, modern techniques and measurement systems in quality assurance and information techniques in production systems	The student knows and is able to use and solve simple and complex engineering problems, methods and tools of quality control products based on computer-aided systems in statistical process control.	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents	<p>Lecture content:</p> <ol style="list-style-type: none"> 1. Statistical process control in quality engineering. 2. Basics of probability calculus and mathematical statistics used in statistical process control. 3. Analysis of the stability and capacity of the production process. 4. Analysis of the stability and capability of measurement systems. 5. Six Sigma methodology. 6. Tools and techniques supporting the statistical control of processes. 7. Computer aided quality. <p>Laboratory content:</p> <ol style="list-style-type: none"> 1. Regulation of processes by means of control cards. 2. Methodology of the analysis of the stability and capability of measurement systems. 3. Uncertainty and measurement error. 4. R&R method for measuring system evaluation. 5. Tools for analyzing problems in quality engineering: Ishikawa Diagram, Pareto Diagram, Block Diagram. 		
Prerequisites and co-requisites	Basic knowledge of production and service management. Knowledge of the basic principles, methods and tools of quality management.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	60.0%	50.0%
	Lectures	60.0%	50.0%
Recommended reading	<p>Basic literature</p> <ol style="list-style-type: none"> 1. Hamrol A.: Zarządzanie jakością z przykładami. PWN. Warszawa, 2005 2. Hamrol A., Mantura W.: Zarządzanie jakością. Teoria i praktyka. PWN. Warszawa, 2002 3. Koronacki J., Nieckuła J., Thompson J.R.: Techniki zarządzania jakością. Od Shewharta do metody Six Sigma. Wyd. EXIT. Warszawa, 2005 4. Sałaciński T.: Elementy metrologii wielkości geometrycznych. Przykłady i zadania. OWPW. Warszawa, 2006 5. Płaska S.: Wprowadzenie do stystycznego sterowania procesami technologicznymi. WPL. Lublin, 2000 		

	Supplementary literature	<p>1 Smith G.M.: Statistical Process Control and Quality Improvement. Pearson Education. New Jersey, 2004.</p> <p>2. Dwiliński L.: Zarządzanie jakością i niezawodnością wyrobów. OWPW. Warszawa, 2000</p> <p>3. Montgomery D.C.: Introduction to Statistical Quality Control. John Wiley & Sons. USA, 2005.</p>
	eResources addresses	<p>Adresy na platformie eNauczenie: Komputerowo wspomagane statystyczne sterowanie procesami (SPC), ZilP, Ist., sem05, zima 23/24 - Moodle ID: 32573 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=32573</p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. SPC and quality management systems based on ISO 9001 standards. 2. Acquiring, sorting, collecting and presenting measurement data. 3. Distribution of variability of features. 4. Plausibility tests. 5. Control cards. 6. Capacity analysis of the production process. 7. 6 Sigma method. 8. Computer Aided Quality 	
Work placement	Not applicable	

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