



## Subject card

Subject name and code	Methods of diagnostics and certification of products, PG_00059498						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group		Optional subject group 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	2		ECTS credits		4.0		
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 inż. Krzysztof Krzysztofowicz				
	Teachers		dr inż. Krzysztof Krzysztofowicz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	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		10.0		45.0	100
Subject objectives	Familiarizing students with the certification system of metallurgical products and the principles of diagnostics of welded structures						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W05] has the knowledge necessary to understand social, economic, legal and other non-technical conditions of activity engineering, including copyright.		He is aware of copyright in engineering activities		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U06] can - when formulating and solving engineering tasks - see their systemic aspects and social conditions, environmental, economic, legal and others		Student proposes methods of diagnostics of welded structures in terms of safe operation, economy and environmental protection		[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	[K7_W03] has an orderly, theoretically founded knowledge related to selected areas of production engineering.		Student knows the basic groups of metallic materials and metallurgical products. Has knowledge about the operation of welded structures		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	[K7_U03] can use information and communication techniques appropriate for acquiring and processing information and performing tasks typical for engineering activities		The student is able to find information on product certification and diagnostics of welded structures in standards, regulations and Internet resources		[SU2] Assessment of ability to analyse information [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		He uses knowledge in the field of mechanical engineering and materials engineering to solve problems in the field of diagnostics of welded structures		[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Accreditation and certification systems for confirming compliance of: tests, quality systems, products, according to European standards EN 450011 series and international standards ISO/IEC 17021. Purposes of certification. Models of certification systems. Procedures and principles of product certification. Certification mode. Product testing. Entities of the certification system. Accreditation of conformity assessment bodies. Semi-finished products and metallurgical products - terminology, forms and classification states, marking, packaging, transport Conformity assessment of metallurgical products. Model of quality assurance in control and final testing of steel products. Types of control documents. Certification of metallurgical products: technical conditions of delivery of wrought products made of steel and non-ferrous metal alloys, technical conditions of delivery of material for forging and forgings, technical conditions of delivery of ingots and castings. Acceptance tests of metallurgical products and semi-finished products. Assessment of the quality of metallurgical products. Office of Technical Inspection - certification of pressure and crane installations. Diagnostics of pressure installations. Threat analysis and risk assessment: Initial Threat Analysis, Threat and Operational Capabilities Analysis, Failure Type and Consequence Analysis, RBI (Risk Based Inspection) Inspection Planning Based on Risk Analysis. Lab: Certification of product conformity. Pressure tanks and equipment, gas cylinders. Pipelines and elements of pipelines. Auxiliary materials for welding. Planning inspections based on risk analysis (RBI) for the selected pressure installation.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		100.0%	40.0%
		50.0%	60.0%
Recommended reading	Basic literature	1. Knosala R. Inżynieria produkcji. Kompendium wiedzy. PWE, 2017 2. Urząd Dozoru Technicznego - przepisy. 3. Łabanowski J., Ocena jakości wyrobów hutniczych. Wyd. Państwowej Wyższej Szkoły Zawodowej w Elblągu, Elbląg 2008.	
	Supplementary literature	1. Norma PN-EN ISO/IEC 17067:2014-01. Ocena zgodności - Podstawy certyfikacji wyrobów oraz wytyczne dotyczące programów certyfikacji wyrobów. 2. Norma PN-EN ISO/IEC 17065:2013-03. Ocena zgodności - Wymagania dla jedno-stek certyfikujących wyroby, procesy i usługi.	
	eResources addresses	Adresy na platformie eNauczanie: Metody diagnostyki i certyfikacji produktów, L, ZiP, sem.2, zimowy, 2023/24 - Moodle ID: 33270 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33270">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33270</a> Metody diagnostyki i certyfikacji produktów, L, ZiP, sem.2, zimowy, 2023/24 - Moodle ID: 33270 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33270">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33270</a>	
Example issues/ example questions/ tasks being completed	Form and qualifying state of a metallurgical product, list examples of states and classification forms of steel, What documents do you know about the inspection of metallurgical products or semi-finished products? The role and tasks of the controller in the quality control of steel products What is the acceptance inspection of metallurgical products or semi-finished products. What types of inspection tests would you use to assess the quality of bar or plate for shipbuilding? List the product accreditation and certification systems Certification objectives. Models of certification systems. Procedures and principles of product certification. Models of quality assurance in control and final testing of steel products Principles of diagnostics of pressure installations List methods of hazard analysis and risk assessment		
Work placement	Not applicable		