GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00071333						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject	2026/2027			
Education level	second-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	Polish			
Semester of study	3		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Division of Manufacturing and Production Engineering -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Aleksandra Wiśniewska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	0.0	0.0	0.0	18
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=4060						
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	18		0.0	0.0	18	
Subject objectives	Understanding and practical use of methods for systemic improvement of production processes to improve efficiency, quality and productivity.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	The student is prepared to actively participate in training, workshops and seminars on Lean Manufacturing, Six Sigma and TPM conducted in English, understands industry terminology and is able to engage in discussions on improving production processes.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)	The student is able to search, analyze and synthesize information from English-language standards, publications and case studies on production improvement methods and use it to design process improvements.	[SU4] Assessment of ability to use methods and tools
[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	The student identifies contemporary trends in production improvement, such as Lean Management, Six Sigma, TPM, production digitalization and integration of methods with the Industry 4.0 concept, and interprets their importance for the development of modern manufacturing systems.	[SW1] Assessment of factual knowledge
[K7_U01] utilizes information obtained from the literature and other sources in the field of Mechanics and Mechanical Engineering and presents and analyses the results of solutions to technical problems in this field	The student uses production improvement methods (VSM, 5S, SMED, OEE, TPM, DMAIC) to analyze technical and organizational problems in production systems and presents the results of analyses and proposals for improvements based on process data and professional literature.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

Subject contents

Course content – lecture
1. Introduction to Production Improvemen: The importance of continuous improvement (Kaizen), Improvement outcomes: cost reduction, quality improvement, productivity growth, improved communication, Improvement as an element of a company's competitive strategy.
2. Evolution of approaches to production organization H. Ford's mass production, Toyota Production System (TPS), The transition from scale efficiency to waste elimination, The concept of customer value.
3. Lean Manufacturing Philosophy and Principles Lean definition and principles: value, value stream, flow, pull system, continuous improvement, 7+1 types of waste (MUDA), The role of organizational culture and leadership.
4. Value Stream Mapping (VSM) Identification of material and information flow, Analysis of the current state and design of the future state, Identification of bottlenecks and losses.
5. 5S and Work Standardization Seiri, Seiton, Seiso, Seiketsu, Shitsuke, standardization as the foundation of process stability, visual workstation management.
6. Kanban System and Flow Control pull system, visual signals and inventory levels, synchronizing production with demand.
7. SMED Reducing Changeover Times the importance of production flexibility, internal and external activities, eliminating waste and standardizing changeovers.
8. TPM Total Productive Maintenance maximizing machine availability, autonomous maintenance, planned maintenance, operator involvement.
9. OEE Overall Equipment Effectiveness availability, efficiency, quality, indicator interpretation and its use.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
activity task test	60.0%	100.0%

Recommended reading

Basic literature	1. Goldratt Eliyahu M. - Cel. Doskonałość w produkcji 2. Womack James P., Jones D. T. - Odchudzanie firm 3. Liker Jeffrey K. - Droga Toyoty
Supplementary literature	4. Imai Masaaki - Gemba Kaizen 5. Hines Peter, Taylor David -Organizacja Lean
eResources addresses	

Example issues/ example questions/ tasks being completed

Introduction to the subject Evolution of the improvement approach - comparing H. Ford's approach to Toyota Lean concept Value stream mapping 5S and work standardization Kanban system Reducing changeover times according to the SMED concept TPM OEE

Practical activites within the subject	Not applicable

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