POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)
pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Production Management in Industry 4.0

Course

Field of study	Year/Semester
Engineering Management	1/2
Area of study (specialization)	Profile of study
Managing Enterprise of the Future	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15		
Tutorials	Projects/seminars	
	15	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Prof. Stefan Trzcieliński, Ph.D., D.Sc., Eng.

Mail to: stefan.trzcielinski@put.poznan.pl

Faculty of Engineering Management

ul. J. Rychlewskiego 2, 60-965 Poznań

Responsible for the course/lecturer:

Ph.D., Eng. Edmund Pawłowski

Mail to: edmund.pawlowski@put.poznan.pl

Faculty of Engineering Management

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Prerequisites

General knowledge about machine technology, production control and infrastructure of Industry 4.0

The ability to thematic search and selection of literature sources.

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Course objective

Preparation of the student to organize and manage production systems in the conditions of automated and robotic processes.

Course-related learning outcomes

Knowledge

The student explains advanced theories and models for digital management of manufacturing processes, including the application of technologies such as the Internet of Things (IoT), artificial intelligence (AI) and machine learning in the context of optimizing industrial performance [P7S_WG_04].

The student describes how to adapt organizational structures to the dynamic environment of Industry 4.0, including the field of automation and robotization of manufacturing processes [P7S_WG_05].

The student analyzes complex networked manufacturing systems and their impact on enterprise competitiveness and innovation [P7S_WG_06].

The student understands integrated manufacturing systems and real-time data management, key to operations management in Industry 4.0 [P7S_WG_10].

Skills

The student applies an interdisciplinary approach to analyzing and solving manufacturing problems, using analytical and simulation tools specific to the Industry 4.0 environment [P7S_UW_01].

The student designs and implements effective operational management strategies, taking into account changing requirements and risks in evolving industrial technologies [P7S_UW_04].

The student conducts a technology audit in a manufacturing company and identifies opportunities to apply Industry 4.0 solutions to improve operational efficiency [P7S_UW_09].

Social competences

The student integrates knowledge from different fields (engineering, IT, management) to create innovative manufacturing solutions within Industry 4.0 [P7S_KK_01].

The student evaluates the effects of introducing new technologies in industry on various areas of business, including sustainability, business ethics and human resource management [P7S_KK_02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Individual or team micro-tasks verifying understanding of lecture content done during the lecture.

Project: development of a team project.

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Programme content

Technologies that changed the world. Operations / production management functions. Business context of operations / production management. Key technologies of Industry 4.0. Capital and organizational consequences of value stream flow; circular economy. Methods supporting the digital transformation of manufacturing enterprises.

Teaching methods

Conversational lecture with multimedia presentation.

Team project including elements of digital transformation of company into Enterprise 4.0.

Bibliography

Basic

Trzcielinski S. (2023). Human Intelligence vs. Artificial Intelligence in Opportunity Discovery.W: Human aspects of advanced manufacturing. Proceedings of the 14th International Conference on Applied Human Factors and Ergonomics and the Affiliated Conferences, San Francisco, USA, 20-24, July, 2023. Red. Waldemar Karwowski, Stefan Trzcieliński: AHFE International, 2023 - s. 100-110.

Unstundag A., Cevickan E. (2018). Industry 4.0: Managing the Digital Transformation. Springer, Cham.

Bartodziej Ch.J. (2017) The Concept Industry 4.0. Springer, Wiesbaden.

Trzcieliński S. (2020). Stan dostosowania systemow utrzymania ruchu do warunkow Przemysłu 4.0. Red. S. Gregorczyk, G. Urbanek, Zarządzanie Strategiczne w Dobie Cyfrowej Gospodarki Sieciopwej. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Additional

Mohammed I.K., Trzcieliński S. (2021). Technology, Innovation and Business Transformation: An Industry 4.0 Perspective. European Research Studies Journal, 2021, vol. 24, spec. iss. 5, s. 492-505.

Mohammed I.K., Trzcieliński S. (2021). The Interconnections Between ICT, Industry 4.0 and Agile Manufacturing. Management and Production Engineering Review, 2021, vol. 12, no. 4, s. 99-110.

Sharma, K.L.S. (2017). Overview of Industrial Process Automation, Elsevier Inc.

Artykuły dostępne na Research Gate; Aricles available at Research Gate

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Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	30	1,0
0Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests, project preparation) [1]	45	2,0

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[1] delete or add other activities as appropriate