COURSE DESCRIPTION CARD - SYLLABUS

Course name
Infrastructure of Industry 4.0 [N1IZarz1>IP]

Course

Field of study
Engineering Management

Year/Semester
3/6

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
10

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Contemporary production management concepts. Basic knowledge about industry 4.0.

Course objective

The aim of the course is to familiarize students with the basic concepts related to industry 4.0 and its impact on the functioning of enterprises in terms of program and server infrastructure.

Course-related learning outcomes

Knowledge:
The student identifies and describes the roles of cyber-physical systems in the context of Industry 4.0, demonstrating an understanding of their functions and impact on the life cycle of machinery [P6S_WG_14].
The student analyzes basic components of Industry 4.0 infrastructure, including cyber-physical systems and the Internet of Things, and their applications [P6S_WG_15].
The student presents strategies for using modern techniques and tools of Industry 4.0 in solving engineering tasks, particularly in the construction and operation of machinery [P6S_WG_16].
The student assesses the application of typical industrial technologies and their development within

Industry 4.0, focusing on innovative techniques and materials [P6S_WG_17].
The student discusses processes and models related to cloud processing and cloud infrastructure solutions used in Industry 4.0 [P6S_WG_16, P6S_WG_17].

Skills:
The student designs systems in accordance with the norms and standards of Industry 4.0, emphasizing compliance with legal, professional, and moral requirements [P6S_UW_08].
The student applies tools and methods to analyze the impact of Industry 4.0 on enterprise operations, focusing on management and production organization aspects [P6S_UW_14, P6S_UW_16].
The student develops strategies for implementing Industry 4.0 technologies, considering innovative solutions and operational efficiency [P6S_UW_08].
The student executes project tasks related to the implementation of Industry 4.0 solutions, considering technical and operational aspects [P6S_UW_14].
The student creates infrastructure projects based on Industry 4.0 technologies, considering both modern approaches to construction and the organization of production units [P6S_UW_16].

Social competences:
The student develops a holistic approach to implementing Industry 4.0, integrating technical, economic, marketing, legal, organizational, and financial aspects [P6S_KO_02].
The student develops skills in assessing the impact of implementing Industry 4.0 technologies on the environment and society, with an emphasis on ethical and sustainable approaches [P6S_KR_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified by one colloquium at the last lecture. The test consists of 10-15 questions (test and open), variously scored. Passing threshold: 50% of points. Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system.

Programme content

The program includes an introduction to the concept of Industry 4.0 and a discussion of its main components: AI, CAM, IoT, BigData, Cloud computing, AR, VR, Digital Twin

Course topics

1. The concept of industry 4.0 - industrial revolutions, components, impact on employees,
2. Artificial intelligence and autonomous systems - types of AI, industrial automation and robotization, computer-aided manufacturing
3. Internet of Things - paradigms, models, infrastructure elements, applications of the Internet of Things,
4. Clouds and the networks of the future - mass data processing, Bigdata, real-time processing, fog and edge computing,
5. Augmented and virtual reality - cyber-physical systems, human-machine interface, reality modeling, Digital Twin,

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.

Bibliography

Basic:
Czwarta rewolucja przemysłowa, Schwab Klaus, Wydawnictwo Studio Emka, 2018

Additional:
The Fourth Industrial Revolution, Schwab Klaus, 2017

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	10	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50