SYLLABUS

Course description

Course code	Course	TECHNOLOGIE PRZEMYSŁU 4.0
MB/O/1/NST/B1.6		**INDUSTRY 4.0 TECHNOLOGIES**

Language of instruction	English
Academic year	2023/2024

field of study:	Mechanics and machine construction
field of specialisation:	All
Educational level	first-cycle studies
Education profile	General academic
Mode of study	Part-time studies
Semester(s)	1

Affiliation with a group of classes	Core subjects
Course status	obligatory

Types of classes, instruction hours, ECTS credits		Types of classes	Number of instruction hours	Number of ECTS credits	
		Lecture	8[h]	1 ECTS	
Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned			1 ECTS
	with qualifications	It is used to acquire engineering competences by the student			1 ECTS
	with science discipline	Mechanical engineering			1 ECTS
Form of teaching		Traditional – classes organized at the University /classes conducted using online learning methods and techniques			
Prerequisites		Mathematics, physics, electrical engineering			

Department	Faculty of Mechanical Engineering
Coordinator	Dr hab. inż. Andrzej Puchalski, prof. UTH
The website of the basic organizational unit	www.mechaniczny.uniwersytetradom.pl
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LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	Knowledge of the basics of new technologies used in the process of digital transformation of enterprises.
Curriculum Content:	LECTURE Industry 4.0 model. Concept, technologies, business models, trends. Digitization of industry. OT/IT convergence. Factory today. Integration of PLC_SCADA_MES_ERP production & management systems. The factory of tomorrow - smart factory. Basic issues in the field of robotics and robotization. Industrial communication standards. Cyberspace. Cloud solutions, benefits and concerns. Digital Twins. Internet of Things IoT and Industrial Internet of Things IIoT. Virtual/Augmented/Mixed Reality VR/AR/MR. Additive manufacturing. Big date. Data Science. AI, machine learning, algorithms and techniques.
Didactic (educational) methods:	• problem methods (problem lecture, conversational lecture), • simulation methods, • practical methods (demonstration, laboratory exercises, project method, simulation
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	The condition for passing the course is to achieve all the required learning outcomes specified for the subject. Lectures are passed on the basis of a written test.

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course (**W**) knows and understands / (**U**) can / (**K**) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Defines basic concepts and understands the basics of Industry 4.0 technology	K_WG14 K_WK21 K_WK23	Lecture	Test	Pass a subject
U1	He can explain the business processes taking place in the company during the implementation of P4.0 solutions	K_UW07 K_UW08 K_UK15 K_UU21	Lecture	Test	Pass a subject
U…					
K1	Discuss and disseminate new solutions in engineering activities	K_KO05 K_KR06	Lecture	Test	Pass a subject
K…					

Literature and teaching aids
1. New paradigm of Industry 4.0 : internet of things, big data & cyber physical systems, ed. by Patnaik, Srikanta, Springer-Verlag 2020
2. Industry 4.0 and engineering for a sustainable future, ed. by Dastbaz, Mohammad, Springer-Verlag 2019
3. https://www.ibm.com/topics/industry-4-0
4. Fourth Industrial Revolution, Schwab K., Penguin Books, 2017
5. Handbook Industry 4.0: Law, Technology, Society, ed. by Frenz W., Springer 2022
6. "SPEED no limits in digital area", A.Poniewierski, 2020 , www.speednolimits.com
7. https://przemyslprzyszlosci.gov.pl/future-industry-platform-the-mission-and-contact/
8. Lecture and tutorial materials, Puchalski A., E-script: Lab. Mechatronics UTH Radom 2023

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits			
	Student workload [h].		
Attendance, participation	Other contact hours (IGK)	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in ... lectures	X	X	8 [h]
Participation in .... classes/laboratory classes			
Meeting with teachers during their duty hours	2 [h]	X	X
Preparation for lectures/classes/.... , Preparation for ... credit / exam	X	15 [h]	X
Total student workload	2 [h]/ 0,1 ECTS	15 [h]/ 0,6 ECTS	8 [h]/ 0,3 ECTS
ECTS credits for the course	25 [h]/ 1 ECTS		

Additional information, comments
In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate. Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).