SYLLABUS

Course description

Course code	Course	**AUTOMATYZACJA PROCESÓW PRODUKCYJNYCH**	
MB/O/I/ST/C2B.3		**AUTOMATION OF MANUFACTURING PROCESSES**	
Language of instruction	English		
Academic year	2023/2024		
field of study:	Mechanical engineering		
field of specialisation:	Designing and manufacturing of machines		
Educational level	first-cycle studies		
Education profile	General academic		
Mode of study	Full-time studies		
Semester(s)	7		
Affiliation with a group of classes	Specialization module		
Course status	Eligible		
Types of classes, instruction hours, ECTS credits	Types of classes	Number of instruction hours	Number of ECTS credits
	Lecture	15[h]	3 ECTS
	Classes	15[h]	
	Classes	15[h]	
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	...0 ECTS
	with qualifications	it serves the student's acquisition of engineering competences	...3 ECTS
	with science discipline	Mechanical engineering	...3 ECTS
Form of teaching	Traditional – classes organized at the University /classes conducted using online learning methods and techniques		
Prerequisites	Mechatronics and automatics, electrical engineering and electronics		
Department	Mechanical Engineering Faculty, UTH Rad		
Coordinator	Dr hab. inż. Andrzej Puchalski, prof. UTH		
The website of the basic organizational unit	www.mechaniczny.uniwersytetradom.pl		
E-mail address, phone number of the coordinator	andrzej.puchalski@uthrad.pl, 7603		

LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	Knowledge of the role of industrial PLCs in the automation and robotics systems. Ability to write and test control programs.
Curriculum Content:	LECTURE Manufacturers and families of industrial controllers. Programming concepts - IEC-1131 and EN 61131 standards Basic and extended programming instructions. PLC in Integrated Engineering. Selected communication standards. Embedded web server. HMI. Elements of visualization of the control process. Supervision and data acquisition systems SCADA. Robotics. LAB/Project Programming and commissioning of PLC controllers with models of electropneumatic and drive systems. Tests PLC programs in the simulator environment.
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. Completion of the laboratory requires the performance of exercises and obtaining positive grades from entrance cards and reports. The method of calculating the final grade for the course is specified in the regulations.

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	Knows of the principles of configuration and programming of industrial PLC controllers	K_WG11 K_WG15	Lecture	Test	Pass a subject
W2	Uses knowledge to program PLC systems	K_WG18 K_WG19	Lecture	Test	Pass a subject
U1	He can tests mechatronic systems with PLC controllers for various physical processes	K_UW09 K_UW12 K_UW13	Lecture/lab	Test	Pass a subject
U…					
K1	Carries out experiments and projects as well as discusses, presents and reports the results of team tasks	K_KK01 K_KK02 K_KR06	Lab	Test	Pass a subject
K…					

Literature and teaching aids
1. Simatic S7-1200- getting started, Siemens 2009 2. S7-1200 Programmable controller System Manual, Siemens 2022 3. WindLDR Ladder Programming Manual, IDEC Corpration 2019 4. S7-200 Programmable Controller System Manual, Siemens 2008 5. S7-1200 CPU 1212/1215C Datasheet 6. Lecture and tutorial materials, Puchalski A., E-script: Lab. Mechatronics UTH Radom 2023 7. Introduction to Robotics. Mechanics and Control, Craig John J., Pearson 2018+

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits			
Attendance, participation	Student workload [h].		
	Other contact hours (IGK)	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in ... lectures	X	X	15 [h]
Participation in .... classes/laboratory classes	X	X	30 [h]
Meeting with teachers during their duty hours	2 [h]	X	X
Preparation for lectures/classes/.... , Preparation for ... credit / exam	X	18 [h] 10 [h]	X
Total student workload	2 [h] / 0,1 ECTS	28 [h] / 1,1 ECTS	45[h] / 1,8 ECTS
ECTS credits for the course	75[h] / 3 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).