

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Automation and Robotics		Code 1011104251010535738
Field of study Logistics - Part-time studies - First-cycle	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time,part-time) part-time	
No. of hours Lecture: 16 Classes: - Laboratory: 14 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: Wojciech Kowalczyk email: wojciech.kowalczyk@put.poznan.pl tel. 61 6652143 Faculty of Computing Piotrowo 3A		Responsible for subject / lecturer: Mateusz Michalski email: mateusz.michalski@put.poznan.pl tel. 61 6652100 Faculty of Computing Piotrowo 3A
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	One has basic knowledge about decimal and binary arithmetic, algebra (also Boole's algebra), differential/integral calculus, complex numbers.
2	Skills	One has an ability to understand technical documentation of devices and their elements. One has an ability of individual and team work; knows how to work on the basis of time schedule and procedures. One is able to prepare documentation of realized tasks, prepare a report which presents results and conclusions.
3	Social competencies	One is aware of necessity to take care of one's own and co-workers' safety in contact with laboratory/technical/industrial environment. One is aware of social and economic consequences of improper, inconsistent with safety rules and unprofessional usage of equipment and technical systems which can generate threats for human life.
Assumptions and objectives of the course: Introduction of basics of automation and robotics from theoretical and practical point of view. Presentation of automation units and their principles of operation.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has a basic knowledge related to industrial automation and robotics - [K1A_W06] 2. Student has a basic knowledge of the structure of industrial manipulators and control systems - [K1A_W07]		
Skills:		
1. Student is able to independently develop a simple project in the area of the subject - [K1A_U05] 2. Student can use known methods to formulate and solve given problem within the area of the subject - [K1A_U09] 3. Student is able to formulate and solve engineering tasks perceive their non-technical and organizational aspects - [K1A_U10]		
Social competencies:		
1. Student is aware of the need for lifelong learning and to inspire and organize the learning process of other - [K1A_K01] 2. Student is willing to cooperate and work in teams to solve given tasks - [K1A_K03]		

Assessment methods of study outcomes		
<p>Forming mark: Lectures: on the basis of answers to questions related to the material discussed in the previous lectures. Laboratories: on a basis of current results of laboratory work.</p> <p>Summary mark: Written exam from lectures. Laboratories pass on a basis of reports.</p>		
Course description		
<p>Economic and social benefits of automation, Watt regulator; control feedback; structure of the control system; control system units and their functions, SISO control and cascade control; hardware and software used in automation, SCADA, mathematical model of the control unit, time and frequency graphs; P, PI, PD, PID controllers - how they work, tuning methodology; PLC, their functionality, functional units of PLC, analog and digital input-output standards used PLCs, normal sweep and constant sweep; sensors for temperature, pressure, position, acceleration, force; design process of automation systems. Kinds of robots, types of manipulators and their properties, characteristics of manipulators, kinematics of the manipulators, rotation matrix and homogeneous transformation; workspace, the typical tasks of industrial manipulators, robot control system ? examples: KUKA and STAUBLI.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. 1. Elektrotechnika i elektronika dla nieelektryków, praca zbiorowa, WNT, 1995 2. 2. Elektrotechnika ogólna, praca zbiorowa, Wyd. Politechniki Śląskiej, Gliwice, 1998 		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	16	
2. Laboratories	14	
3. Consultations	15	
4. Exam	5	
5. Exam Preparation	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	90	4
Contact hours	45	2
Practical activities	14	1