COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation and robotics of processes [N2Inf1-IWPB>ARP]

Course

Field of study
Computing

Year/Semester
2/3

Area of study (specialization)
Information Technology in Business Processes

Profile of study
general academic

Level of study
second-cycle

Course offered in
polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
16

Laboratory classes
16

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

A student starting the course should have basic knowledge of automation and management systems. He/she should also have the ability of obtain information from the indicated sources and be willing to cooperate within the team.

Course objective

The aim of the course is to present the information about the organization tasks of automation and robotics for research, services, storage and production processes" migration to INDUSTRY 4.0 solutions. The second part the lecture shows the examples of production and assembly lines" automation and robotics (e.g. in medicine, environmental engineering and education).

Course-related learning outcomes

Knowledge:
A student:
1. has an orderly, theoretical knowledge of computer system architectures, computer systems and networks, operating systems especialy real time operating systems and SCADA systems - [K2st_W2, K2st_W6]

2. knows and understands the operating rules of peripherial modules and communication interfaces utilized for automation and robotics [K2st_W4]
3. knows the conditions and restrictions of intelligent technology application for migration to conception of Industy 4.0 [K2st_W6, K2st_W9]
4. knows the operation rules of controllers and its peripherials utilized for industry control systems [K2st_W3]

Skills:
A student:
1.is able to find the information from literature, data bases and from other sources, also in foreign languages [K2st_U1]
2. is able to conduct simulation procedures to verify choosen solutions [K2st_U3,K2st_U4,K2st_U6, K2st_U9, K2st_U10]
3. is able to elaborate the automation conception of a choosen process by using the proper computer science tools and methods [K2st_U5, K2st_U11, K2st_U16]
4. appreciates the importance of the team work in looking for the best solutions and is able to cooperate within the team [K2st_U8, K2st_U15]

Social competences:
A student:
1. understands the necessity of continuous education in the field of computer technology and is able to organize the education processes [K2st_K1]
2. understands the importance of non-technics aspects of engineering activity, its impact on the environment and one"s own decision responsibility [K2st_K2]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: written test of knowledge
- theoretical quiz: about 10 questions with different value of points
Evaluation: scale of points - proposition of a grade; possibility of test inspection; possibility of an oral exam (only with minimum 33% of points)
Final points result:
to 50% - unsufficient (F)
51% - 60% - sufficient (E)
61% - 70% -satisfactory plus (D)
71% - 80% - good (C)
81% - 90% - good plus (B)
over 91% - very good (A)
Laboratory: activity during exercises" realization, evaluation of preparation for solving the problems, written protocols from exercises.

Programme content

Programme content - lecture
Basic definitions concerning automation and robotics. Main conditions and restrictions for robotics and automation. Utilizing computer systems for modeling and simulation. Computer Control Sytems: classification, PLCs, microcontrollers, emedded systems, IOT. Monitoring of centralized and distributed processes (SCADA systems). Automized production systems. Creation conditions of INDUSTRY 4.0. The conception of Building Systems" Automation (IBS). The examples of automation and robotics for choosen processes.
- laboratory
Utilization of MATLAB/Simulink for modeling and simulation
PLC programming for choosen physical laboratory models

Teaching methods

1. Lecture - multimedia presentation showing basic knowledge and new Polish and foreign examples in use.

2. Laboratory - the simulation exercises using MATLAB/Simulink and practical exercises by using control algorithms for phisical model examples (pomp station, resevoirs, wentilation and air condotioning elements)

Bibliography

Basic
1.Urbaniak A., Komputerowe wspomaganie eksploatacji obiektów i procesów w inżynierii środowiska, Wyd. PAN, Warszawa 2016
2. https://przemysl-40.pl/index.php/2019/09/21/industry-4-0-raporty-i-opracowania-2019/
3.Sroczan E.M., Nowoczesne wyposażenie techniczne domu jednorodzinnego, Pow. Wyd. Rolnicze i Leśne, Warszawa 2019
4. Urbaniak A., Systemy wbudowane - wykłady: dostęp na: (http://wazniak.mimuw.edu.pl/index.php?title=Systemy wbudowane
Additional
1. Heimann B., Gerth W., Popp K., Mechatronika - Komponenty, metody, przykłady, Wyd. Naukowe PWN, Warszawa 2001
2. Urbaniak A., Podstawy automatyki, Wyd. PP, Poznań 2007
3. Koczyk H., Antoniewicz B., Sroczan E., Nowoczesne wyposażenie techniczne domu jednorodzinnego, Państ. Wyd. Rolnicze i Leśne, Poznań 1998

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	32	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	68	2,50