COURSE DESCRIPTION CARD - SYLLABUS

Course name
Flexible manufacturing systems [S1AiR1E>PO4-ZSW]

Course

Field of study
Automatic Control and Robotics

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
45

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Student starting this course should have knowledge of the basics of programming, architecture of computer systems and operating systems, basics of automation, linear algebra. He should also have the ability to obtain information from the indicated sources.

Course objective

The aim of the course is to understand the problems of production management and control in automated systems and methods for the design and implementation of industrial automation systems. Getting to know the methods of modeling, design and optimization of automated workstations and production lines, and especially computers integrated production systems

Course-related learning outcomes

Knowledge:
Has a basic knowledge of the theory and basic methods of artificial intelligence and decision systems [K1_W7 (P6S_WG)].
Is familiar with the current status and latest development trends of the field of automation and robotics [K1_W21 (P6S_WG)].

Knows and understands the fundamental dilemmas of modern civilisation related to the development of automation and robotics [K1_W28 (P6S_WK)].
Skills:
Can design and practically use simple diagnostic and decision-making systems dedicated to automation and robotics systems [K1_U21 (P6S_UW)].
Is able to develop a solution to a simple engineering task and implement, test and run it in a selected programming environment on a PC for selected operating systems [K1_U26 (P6S_UW)].
Social competences:
Is ready to critically assess his/her knowledge; understands the need for and knows the possibilities of continuous training - improving professional, personal and social competence, is able to inspire and organize the learning process of others [K1_K1 (P6S_KK)].
The graduate is ready to fulfil social obligations and co-organise activities for the benefit of the social environment; is aware of the social role of a graduate of a technical university and understands the need to formulate and convey to the public (in particular through the mass media) information and opinions on the achievements of automation and robotics and other aspects of engineering activities; the graduate makes efforts to communicate such information and opinions in a generally understood manner [K1_K7 (P6S_KO)].

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 exam (checking theoretical knowledge) in the field of lectures: concepts, methods, algorithms.
Laboratories: checking practical skills in the field of implementation of selected methods introduced during the lecture, evaluation of reports.

Programme content

Lecture. Automation of production processes --- discrete automation concepts, organizational preparation of production, design, operation and evaluation of performance. Production planning and scheduling. Modeling of production systems --- queuing theory, optimization methods, computer simulations. Petri nets --- theoretical and application. Concurrent processes and synthesis of control algorithms. Computer integrated manufacturing and design of flexible manufacturing systems.
Laboratory. Studies review on selected topics of analysis of production systems and flexible automation equipment. Simulations of some aspects of the systems, production lines and stations.

Course topics

none

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples
2. Laboratory exercises: carrying out the tasks given by the teacher - practical exercises

Bibliography

Basic
1. Z. Banaszak, L. Jampolski, Komputerowo wspomagane modelowanie ESP, WNT, 1991.
2. J. Honczarenko, Elastyczna automatyzacja wytwarzania, WNT, 2000
3. J. Gawlik, J. Plichta, A. Świć, Procesy produkcyjne, PWE, Warszawa, 2013
Additional
1. S. Lis, K. Santarek, S. Strzelczak, Organizacja elastycznych systemów produkcyjnych, PWN, 1994
2. M. Chlebus, Techniki komputerowe CAx w inzynierii produkcji, WNT, 2000
3. M. Syslo, N. Deo, S. Kowalik, Algorytmy optymalizacji dyskretnej z programami w jezyku Pascal, PWN, Warszawa, 2001

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	5,00
Classes requiring direct contact with the teacher	75	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	2,50