COURSE DESCRIPTION CARD - SYLLABUS

Course name

Integration of Automation Systems

Course

Field of study

Automatic Control and Robotics

Year/Semester

1/2

Area of study (specialization)

Control and Robotics Systems

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
	15	
Tutorials	Projects/seminars	
	15	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr. inż. Marcin Kiełczewski

email: marcin.kielczewski@put.poznan.pl

tel. 61 6652368

Faculty of Control, Robotics and Electrical

Engineering

ul. Piotrowo 3a, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge: The student starting this course should have basic knowledge of automation, programming of industrial manipulators and industrial networks.

Skills: The student should have the ability to program in high-level languages and the ability to obtain information from the indicated sources. They should also understand the need to expand their competences and be ready to cooperate within the team.

Social Competences: In addition, in terms of social competences, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

1. Provide students with practical knowledge on the integration of automation and robotics systems and devices.

2. Developing students ability to solve problems related to system integration.

3. Forming students teamwork skills.

Course-related learning outcomes

Knowledge

1. has specialist knowledge in the field of integration of selected automation systems and devices running on real-time systems and communication techniques - [K2_W3]

2. has extended knowledge within selected areas of robotics - [K2_W10]

Skills

1. is able to analyze and interpret technical design documentation and use scientific literature related to a given problem - [K2_U2]

2. can integrate and program specialized robotic systems - [K2_U12]

3. is able to select and integrate elements of a specialized measurement and control system, including: a control unit, an executive system, a measuring system, and peripheral and communication modules - [K2_U13]

4. can make a critical analysis of the operation of control systems or robotics systems - [K2_U19]

5. can identify elements and control systems and formulate a design specification of a complex control system, taking into account non-technical aspects - [K2_U21]

Social competences

1. is aware of responsibility for their own work and is ready to collaborate and cooperate in a team, and take responsibility for jointly performed tasks; is able to set goals and define priorities leading to the implementation of the task - [K2_K3]

2. is aware of the need for a professional approach to technical issues, scrupulous reading of the documentation and environmental conditions in which the devices and their components may function, is aware of the responsibility for the decisions made - [K2_K4]

3. is aware of the dangers of the work and use of industrial manipulators - [-]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In the field of laboratory, verification of the assumed learning outcomes is carried out by assessing the preparation and skills related to the implementation of laboratory exercises and prepared reports.

In terms of the project by assessing the knowledge and skills related to the implementation of project tasks on the basis of the presentation of the project and the student's discussion of the project implementation report. This assessment also includes the ability to work in a team.

Programme content

Laboratory and project classes are conducted in the form of seven 2-hour meetings held in the laboratory. During the classes, tasks are performed by teams of 2-3 students. Laboratory exercises include advanced programming of KUKA, Staubli and Fanuc robots as well as programming of industrial vision systems.

Project tasks include the following topics. The use of industrial manipulators, PLC controllers and automation actuators for the implementation of selected tasks and cooperation with sensor systems. Information exchange between systems through communication interfaces. Advanced robot programming techniques, the use of automatic external mode in KUKA robots, multi-tasking. Preparation for selected HMI systems and devices using high-level languages.

Teaching methods

1. Project: team work, demonstration of operation.

2. Laboratory: practical exercises, demonstration of operation.

Bibliography

Basic

1. Springer Handbook of Automation, S.Y. Nof (Edytor), Springer 2009

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, collecting technical documentation, preparation for laboratory and project classes, preparation of a project report) [1]	25	1,0

[1] delete or add other activities as appropriate