COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of automation

Course

Field of study

Education in Technology and Informatics

Year/Semester

3/5

Area of study (specialization)

-

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

Lecturers

Responsible for the course/lecturer:

Phd Eng. Dominik RYBARCZYK

email: dominik.rybarczyk@put.poznan.pl

tel. 61 665 2187

Faculty of Mechanical Engineering

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Mathematics in the field of set theory, complex numbers, differential equations, Boolean algebra, Laplace and Fourier transforms. Operate on complex variables, solve simple differential equations, apply Laplace and Fourier transformations. Understanding the need to expand your competences, readiness to cooperate as part of the team.

Course objective

1. Getting to know the basics of automation

2. Shaping students' teamwork skills.

Course-related learning outcomes

Knowledge

1. Knows what statics and dynamics of automation systems are and knows the basic concepts, structure, construction and operation of automation systems [K2_W13], [K1_W14].

2. Knows operator transfer functions, step responses of basic elements. Knows what the classic PID controller [K1_W13] is.

3. Knows what they are and how to determine the frequency characteristics. Knows the concept and methods of stability testing [K1_W13]

4. Knows what are binary functions, combinational and sequential circuits [K1_W13].

5. Knows methods of minimizing and implementing binary functions on contact elements and logic gates [K1_W13] [K1_W14]

Skills

1. Can describe the statics and dynamics of basic linear terms [K1_U4].

2. Can determine the operator transfer functions of basic automatics and determine their step responses [K1_U4].

3. Can use the PID controller and determine the stability of the system [K1_U4], [K1_U19].

4. Can determine the frequency characteristics of basic elements [K1_U19].

5. Is able to realize a given combinational and sequential binary function [K1_U4], [K1_U16].

Social competences

1. Understanding the requirement of learning by whole life; ability to inspire and organize learning process of other people.

2. Aware of the role of electronics in modern economy and its importance for the development of society and the environment.

3. Ability to think and act in a creative and enterprising way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Credit based on a written essay consisting of 5 general questions

Laboratory: Assessment based on the correct implementation of exercises and reports on each laboratory exercise according to the instructions of the laboratory teacher. Short entrance tests before the exercises, written final test after the exercises. In order to pass the laboratories, all exercises must be passed (positive grade from the answers and the report).

Classes: Assessment based on the final test

Programme content

Description of automation objects. Open and closed systems. Static and dynamic properties of elements and linear systems of automation. Operator transmittances of linear elements. Creating and transforming flowcharts. Regulators and their selection. Evaluation of the operation of the automatic control system - quality of control. Frequency characteristics. Stability. Nonlinear systems. Two-position adjustment. Basics of Boolean algebra. Functions of 2nd variables. Implementation of two-state systems. Minimization and implementation of any logical functions. Sequential systems. Basic digital elements.

Teaching methods

Lecture/Labolatory

Bibliography

Basic

1. Pułaczewski J. „Automatyka”.

2. Antonowicz J. „Automatyka”.

3. Mikulski A. „Elementy przekaźnikowych urządzeń automatyki”.

4. Findeisen W. „Technika regulacji automatycznej”.

Additional

1. Kindler H., Buchta H., Wilfert H. „Zadania z techniki regulacji automatycznej“.

2. Parszewski Z. „Laboratorium teorii maszyn i regulacji automatycznej”

Breakdown of average student's workload

	Hours	ECTS
Total workload	95	4,0
Classes requiring direct contact with the teacher	53	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	60	3,0

[1] delete or add other activities as appropriate