COURSE DESCRIPTION CARD - SYLLABUS

Course name

Automation

Course

Field of study

Transport

Year/Semester

2/4

Area of study (specialization)

-

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

9

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Ph.D., D.Sc. Wojciech Sawczuk

email: wojciech.sawczuk@put.poznan.pl

tel. +48 61 224 4510

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznan

Responsible for the course/lecturer:

MSc. Julian Kominowski

email: julian.kominowski@put.poznan.pl

tel. +48 61 665 2841

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Prerequisites

KNOWLEDGE: the student has a basic knowledge of automation in means of transport. SKILLS: the student is able to use the acquired knowledge in learning and solving autoamatic problems. SOCIAL COMPETENCES: The student is able to define important priorities in solving the tasks set before him, is able to effectively cooperate in a group taking different roles in it Objective of the course Understanding the role of automation in transport, getting to know the construction and purpose of automatic devices, interpretation of the characteristics of automation components.

Course objective

Understanding the role of automation in transport and mechanics, and improving efficiency and effectiveness in traffic management and vehicle monitoring.

Course-related learning outcomes

Knowledge

The student has extended and in-depth knowledge of physics useful for formulating and solving selected technical tasks, in particular for correct modeling of real problems

The student has ordered and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues in this discipline of transport engineering

The student knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature engineering

Skills

The student is able to properly plan and conduct perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions

The student is able, when formulating and solving tasks in the field of transport, to apply appropriately selected methods, including analytical, simulation or experimental methods

Social competences

The student understands that in technology, knowledge and skills very quickly become obsolete

The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

For discussion, ongoing preparation and activity in class. Written credit for lectures and classes.

Programme content

Definition of control, control device and automatic control, definition of the set point, current value and control input, definition of the controller, control variable and control variable, diagram and description of the open and closed control system, control system in steady and transient states and what conclusions result from it, types and characteristics of input signals and their equations, operator and spectral transfer function, formulas and an example, the essence of the Laplace transform, an example of any two transformations, types of terms in an automatic control system with a diagram, Connecting terms (series, parallel, with feedback)) formulas and examples, connecting terms (serial, parallel, with feedback) formulas and examples, types of linear elements, f (t) functions, transfer functions, characteristics, and examples, Nyquist and Bode frequency characteristics, examples on any terms, testing properties static and dynamic (static and dynamic characteristics), time constant versus period, methods of determining on the example of any element, tasks of regulators in the automatic control system, division of regulators with description and examples, characteristics of P, I, PI, PD and PID

regulators, error and insensitivity zone of selected controllers, integration time and differentiation time on the example of selected controllers, time waveforms at the output for ideal and real controllers.

Teaching methods

1. Lecture with multimedia presentation. 2. Exercises - solving problems.

Bibliography

Basic

1. Żelazny M., Podstawy automatyki, Materiały pomocnicze do wykładu,

2. Rumatowski K., Podstawy automatyki cz.1, Wydawnictwo Politechniki Poznańskiej 2004,

3. Rumatowski K., Podstawy automatyki cz.2, Wydawnictwo Politechniki Poznańskiej 2004.

Additional

1. Urbaniak A., Podstawy automatyki, Wydawnictwo Politechniki Poznańskiej 2001,

2. Horla D., Podstawy automatyki, Wydawnictwo Politechniki Poznańskiej 2003.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	27	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	63	3,0

[1] delete or add other activities as appropriate