COURSE DESCRIPTION CARD - SYLLABUS

Course name
Automation and Robotics

Course

Field of study
Aviation Engineering

Year/Semester
2/3

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
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:
Ph.D., D.Sc. Wojciech Sawczuk

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Responsible for the course/lecturer:
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Prerequisites

The student has a basic knowledge of automation, information and telecommunications technologies, knows the basics of the theory of probabilistic processes, harmonic signals and graph theory.

The student is able to apply the acquired knowledge in learning and solving automation problems.

The student is able to define important priorities in solving the tasks set before him, he is able to effectively cooperate in a group taking different roles in it.

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

1.has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probability, analytical geometry necessary to: describe the operation of discrete mechanical systems, understand computer graphics methods, describe the operation of electrical and mechatronic systems,

2.has a structured, theoretically founded general knowledge covering key issues in the field of on-board equipment, as well as on-board and terrestrial electronic communication systems,

3. has a structured, theoretically founded general knowledge covering key issues in the field of flight safety and risk assessment.

Skills

1. is able to use the following languages: native and international to a degree enabling the understanding of technical texts and writing technical descriptions of machines in the field of aviation and aerospace using dictionaries (knowledge of technical terminology),

2.can communicate using various techniques in the professional environment and other environments using the formal notation of construction, technical drawing, concepts and definitions of the scope of the field of study studied,

3. is able to obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

Social competences

1. understands the need for lifelong learning; can inspire and organize the learning process of other people,

2. is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions made.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The learning outcomes presented above are verified as follows: Passing test

Programme content

1. Definition of steering, steering and automatic control device,

2. Definition of the set point value, current value and control force,

3. Definition of controller, control variable and control variable,

4. Diagram and description of the open and closed control system,

5. The control system in steady and unsteady states and what conclusions result from it,

6. Types and characteristics of input signals and their equations,

7. Operator and spectral transmittance, formulas and an example,

8. The essence of Laplace transform, an example of any two transformations,

9. Types of elements in the automatic control system with a diagram,

10. Connecting terms (serial, parallel, with feedback) patterns and examples,

11. Types of linear elements, f (t) functions, transfer functions, characteristics, and examples,

12. Frequency characteristics of Nyquist and Bode, examples on any terms,

13. Examination of static and dynamic properties (static and dynamic characteristics),

14. The time constant and the period, methods of determining on the example of any term,

15. Tasks of regulators in the automatic control system,

16. Division of regulators with description and examples,

17. Characteristics of P, I, PI, PD and PID controllers,

18. Error and insensitivity zone of selected regulators,

19. Integration time and differentiation time on the example of selected controllers,

20. Output time waveforms for ideal and real controllers.

Teaching methods

Informative (conventional) lecture (providing information in a structured way) - may be of a course (introductory) or monographic (specialist) character.

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,

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

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

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

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

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

Additional

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

2. Wiak S., Mechatronika cz.2, Wydawnictwo Politechniki Łódzkiej 2010,

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

4. Wiak S., Mechatronika cz.2, Wydawnictwo Politechniki Łódzkiej 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,0
Classes requiring direct contact with the teacher	15	0,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	0,5

[1] delete or add other activities as appropriate