STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Automatics and Robotics		**1010604131010622491**

Field of study	Profile of study (general academic, practical)	Year /Semester
Aerospace Engineering	**(brak)**	**2 / 3**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
Aircraft Transport	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **9** Classes: **-** Laboratory: **-** Project/seminars: **-**	**1**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

EngD Wojciech Sawczuk
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Responsible for subject / lecturer:

M.Eng Julian Kominowski
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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student has a basic knowledge of automation, information technology and telecommunications, knows the basics of the theory of probabilistic processes, harmonic signals and graph theory.
2	**Skills**	Student is able to apply his knowledge in learning about and solving automation problems.
3	**Social competencies**	The student is able to determine the priorities important in solving the tasks posed before him, he can effectively collaborate in the group taking on different roles.

Assumptions and objectives of the course:

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

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probabilistic, analytical geometry necessary for: description of the operation of discrete mechanical systems, understanding of computer graphics methods, description of the operation of electrical and mechatronic systems - [K1A_W01]

2. has a structured, theoretically founded general knowledge covering key issues in the field of on-board equipment, as well as on-board and ground-based electronic communication systems - [K1A_W09]

3. has a structured, theoretically founded general knowledge covering key issues in the field of flight safety and hazard risk assessment - [K1A_W12]

Skills:

1. knows how to use native and international languages to the extent that it allows to understand technical texts and write technical descriptions of machines in the field of aviation and astronautics (technical terminology) - [K1A_U01]

2. is able to communicate using various techniques in a professional environment and other environments using a formal record of construction, technical drawing, concepts and definition of the scope of the studied field of study - [K1A_U02]

3. can obtain information from literature, the Internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions - [K1A_U04]

Social competencies:

1. understands the need to learn throughout life; can inspire and organize the learning process of other people - [K1A_K01]

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 - [K1A_K02]

Assessment methods of study outcomes

Final test

Course description

1. Definition of control, control device and automatic control,
2. Definition of the set point, current value and control force,
3. Definition of the controller, setting variable and control variable,
4. Diagram and description of the open and closed control system,
5. The system of regulation in a steady state and undetermined state and what conclusions result from it,
6. Types, characteristics of input signals and their equations,
7. Transmission and spectral transmittance, formulas and example,
8. The essence of Laplace's transformation, an example of any two transformations,
9. Kinds of elements appearing in the automatic control system with the diagram,
10. Connecting elements (serial, parallel, with feedback) patterns and examples,
11. Types of linear elements, functions f (t), transmittances, characteristics, and examples,
12. Frequency characteristics of Nyquist and Bego, examples on any elements,
13. Study of static and dynamic properties (static and dynamic characteristics),
14. Time constant and period, methods of determination on the example of any member,
15. Tasks of regulators in the automatic control system,
16. Distribution of regulators with description and examples,
17. Characteristics of P, I, PI, PD and PID regulators,
18. Error and dead zone of selected regulators,
19. Time of integration and differentiation time on the example of selected regulators,
20. Time courses on the output for ideal and real controllers.

Basic bibliography:

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

Additional bibliography:

1. Horla D., Podstawy automatyki, Wydawnictwo Politechniki Poznańskiej 2003
2. Wiak S., Mechatronika cz.2, Wydawnictwo Politechniki Łódzkiej 2010

Result of average student's workload

Activity	Time (working hours)
1. Preparation for the lecture	1
2. Participation in the lecture	15
3. Strengthening the content of the lecture	1
4. Consultations for the lecture	1
5. Preparation for the exam	1
6. Participation in the exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	21	1
Contact hours	16	1
Practical activities	0	0