STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Automation		**1010601341010622392**
Field of study: **Transport**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **2 / 4**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **2** Classes: **1** Laboratory: **-** Project/seminars: **-**		No. of credits: **4**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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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 a structured and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues of this discipline in transport engineering - [T1A_W04]

2. has basic knowledge about the life cycle of transport means, both hardware and software, and in particular about the key processes taking place in them - [T1A_W06]

3. knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of engineering nature - [T1A_W07]

Skills:

1. is able to obtain information from various sources, including literature and databases, both in Polish and in English, appropriate to integrate them, make their interpretation and critical assessment, draw conclusions, and fully justify the opinions they formulate - [T1A_U01]

2. can properly plan and perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions from them - [T1A_U03]

3. can, by formulating and solving tasks in the field of transport, apply properly selected methods, including analytical, simulation or experimental methods - [T1A_U04]

Social competencies:

1. understands that in the technology knowledge and skills quickly become obsolete - [T1A_K01]

2. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the reasons for malfunctioning transport systems that led to serious financial or social losses or to serious health and even life loss - [T1A_K02]

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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	10
2. Participation in the lecture	30
3. Strengthening the content of the lecture	10
4. Consultations for the lecture	2
5. Preparation for the exam	8
6. Participation in the exam	2
7. Preparation for exercises	5
8. Participation in exercises	15
9. Strengthening the content of exercises	5
10. Consultations for exercises	2
11. Preparation for passing	4
12. Participation in the credit	2

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	53	2

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Practical activities	0	0

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