STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Automatics and Robotics		**1010621251010622491**
Field of study: **Mechanical Engineering**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **3 / 5**
Elective path/specialty: **Internal Combustion Engines**	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: **3**
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: **technical sciences**		ECTS distribution (number and %): **3 100%**

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 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 - [M1_W01]
2. Has knowledge in physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialized lectures in the theory of construction materials and materials, theory of machines and mechanisms, the theory of electric drives and mechatronic systems - [M1_W02]
3. Has basic knowledge of the basics of machine construction and the theory of machines and mechanisms, including mechanical vibrations - [M1_W05]

Skills:

1. Can acquire information from literature, the internet, databases and other sources. Can integrate the information obtained and interpret conclusions and create and justify opinions - [M1_U01]
2. Is able to properly use modern equipment to measure the main physical quantities used in machine testing and production control - [M1_U04]
3. He can use the acquired mathematical theories to create and analyze simple mathematical models of machines and their components as well as simple technical systems - [M1_U06]

Social competencies:

1. Is ready to critically evaluate your knowledge and content you receive - [M1_K01]
2. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem - [M1_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	5
2. Participation in the lecture	30
3. Strengthening the content of the lecture	5
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	85	3
Contact hours	53	2

Practical activities	0	0