STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Automation		**1010631261010622392**
Field of study: **Transport**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **3 / 6**
Elective path/specialty: **Engineering of Pipeline Transport**	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: **1** Classes: **1** Laboratory: **1** 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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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student should have basic knowledge in mathematical analysis, mathematical logic and in the domains of electronics and electrotechnics
2	**Skills**	Student can apply his knowledge in the identification and resolving issues in the domain of automatics control systems.
3	**Social competencies**	Student can identify priorities during the process of problem solving

Assumptions and objectives of the course:

Student must understand the utility and functions of control systems in the on-board vehicle systems and in the automation of transportation processes.

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

Knowledge:

1. Has the knowledge concerning the analysis and implementation of functional models used in the design of control systems - [-]
2. Has understanding of the modeling of logical and digital systems - [-]
3. Has the basic knowledge regarding of control devices, their characteristics and functionality in on-board vehicle and transportation systems - [-]

Skills:

1. Can make use of the terminology intrinsic in the domain of control system - [-]
2. Can analyze common aspects of the control systems and data information exchange used in both on-board vehicle systems and traffic management systems - [-]
3. Can co-operate in design and implementation of the control systems making use of the modern information and communication technologies - [-]

Social competencies:

1. Understand social and economic aspects of the usage of control systems, especially from the perspective of the transportation sustainable development - [-]

Assessment methods of study outcomes

Written test

Course description		
Physical and mathematical models of analogue and digital control systems. The structure of the control system models. Negative and positive feedback. System stability. Types of controllers. Choice of types, structure and parameters of PID controller. Sensors and actuators. Modeling of the logical systems, both combinational and sequential. Implementation of the control systems using programmable logic controllers (PLC). Examples of traffic control systems. Intelligent transportation systems.		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity		**Time (working hours)**
Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	80	3
Contact hours	47	2
Practical activities	33	1