

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Automation		Code 1010621261010622392
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 6
Elective path/specialty Railway 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: dr inż. Arkadiusz Barczak email: arkadiusz.barczak@put.poznan.pl tel. 61-665-20-11 Faculty of Working Machines and Transportation ul. Piotrowo 3, 60-965 Poznań		
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		

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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