STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mechatronics in Transportation		**1010602221010642251**

Field of study	Profile of study (general academic, practical)	Year /Semester
Transport	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

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

No. of hours				No. of credits
Lecture: **2**	Classes: **-**	Laboratory: **-**	Project/seminars: **-**	**2**

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 %)
technical sciences	**100 2%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

Msc eng Jan Górecki
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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of the component systems of vehicles, their construction, performance and principles of operation.
2	**Skills**	The selection of sensors, actuators and measurement systems in vehicles
3	**Social competencies**	It has a sense of responsibility for decisions made in the design process.

Assumptions and objectives of the course:

Getting to the construction, operation, mechatronic systems in transport.

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

Knowledge:

1. Knowledge of control systems in vehicles, their construction, parameters and principles of operation - [K2A_W14]
2. Knowledge of control systems for automated warehouse systems - [K2A_W15]

Skills:

1. The selection of sensors, actuators and measuring systems - [K2A_U15]
2. Diagnosing faults occurring in mechatronic systems - [K2A_U14]

Social competencies:

1. Understand the need for lifelong learning; able to inspire and organize the learning process of others - [K2A_K04]
2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for decisions - [K2A_K02]
3. Is aware of its social and mechanical engineer and understands the need for and ability to deliver opinions and knowledge of the art technology in the field of mechanical engineering, especially through the mass media - [K2A_K08]

Assessment methods of study outcomes

written test

Course description

Principle of operation and construction of the systems responsible for maintaining the temperature in the vehicle (heating, air conditioning). Electronic engine controls. Electronic control of the clutch. Automatic speed control (cruise control). Application and data bus protocols to transfer information and commands between mechanical components and drivers. Block Diagram of systems. The types of data networks for use in vehicles. Buses used in vehicles: CAN, LIN, MOST, FlexRay. Construction and operation of automated storage systems. Construction of stacker cranes with power and control. Construction of cargo handling systems. Automated parking systems.

Basic bibliography:

1. Fryśkowski B., Grzejszczyk E.: Systemy transmisji danych WKiŁ Warszawa 2010
2. Gajek A., Juda Z.: Czujniki WKiŁ Warszawa 2009

Additional bibliography:

1. Herner A., Riehl H.J.: Elektrotechnika i elektronika w pojazdach samochodowych
2. Korzeń Z.: Logistyczne systemy transportu bliskiego i magazynowania. TOM I Infrastruktura, technika, informacja. Instytut Logistyki i Magazynowania w Poznaniu. Poznań 1998

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	30
2. Fixing the lecture	10
3. Consultation regarding the content of the lecture	4
4. Exam Preparation	4
5. Participation in the exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	36	1
Practical activities	0	0