STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mechatronics in Transportation		**1010631321010642251**
Field of study: **Transport**	Profile of study (general academic, practical): **general academic**	Year /Semester: **1 / 2**
Elective path/specialty: **Engineering of Pipeline Transport**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **2** Classes: **-** Laboratory: **-** Project/seminars: **-**		No. of credits: **2**
Status of the course in the study program (Basic, major, other): **other**	(university-wide, from another field): **university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

Piotr Perz
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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of vehicle component systems, their construction, parameters and the basics of action.
2	**Skills**	Selection of sensors, components and measuring systems in vehicles.
3	**Social competencies**	Is aware of the responsibility for decisions made in the construction process.

Assumptions and objectives of the course:

-Acquainting with the construction, operation, mechatronic systems in means of transport.

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

Knowledge:

1. has knowledge about development trends and the most important new achievements of transport means and other, selected, related scientific disciplines - [T2A_W04]
2. knows advanced methods, techniques and tools used to solve complex engineering tasks and conduct research in a selected area of transport - [T2A_W06]

Skills:

1. can make a critical analysis of existing technical solutions and propose their improvements (improvements) - [T2A_U08]
2. can - using conceptually new methods - solve complex tasks in the field of transport engineering, including atypical tasks and tasks containing a research component - [T2A_U10]

Social competencies:

1. understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems - [T2A_K02]
2. is aware of the need to develop professional achievements and comply with the rules of professional ethics - [T2A_K04]
3. understands the importance of popularizing activities regarding the latest achievements in the field of transport engineering - [T2A_K03]

Assessment methods of study outcomes

-Written test

Course description

-The principle of operation and construction of systems responsible for maintaining the temperature in the vehicle (heating, air conditioning). Electronic engine control. Electronic clutch control. Automatic speed regulation (cruise control). Application of data bus and protocols for sending information and commands between mechanical components and controllers. Block schemes of systems. Types of data transmission networks used in vehicles. Bus used in vehicles: CAN, LIN, MOST, FlexRay. Construction and operation of automated storage systems. Construction of stacker cranes with drive and control. Construction of cargo handling systems. Automated parking systems.

Basic bibliography:

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

Additional bibliography:

1. Herner A., Riehl H.J.: Elektrotechnika i elektronika w pojazdach samochodowych

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture	30
2. Fixing the content of the lecture	15
3. Consultations regarding the content provided during the lecture	5
4. Preparation for the exam from the material provided during the lecture	8
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