

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Electronics in Means of Transport</b>		Code <b>1010631251010622371</b>
Field of study <b>Transport</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>Engineering of Pipeline Transport</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: - Classes: - Laboratory: <b>1</b> Project/seminars: -		No. of credits <b>1</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>1 100%</b>
<b>Responsible for subject / lecturer:</b>  Maciej Babiak, PhD email: maciej.babiak@put.poznan.pl tel. 48 61 665 2049 Faculty of Machines and Transport 3 Piotrowo street, 60-965 Poznan, Poland		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	The student has academic level knowledge in area of electricity and means of transport construction
2	<b>Skills</b>	The student has the ability of gaining informations from diagrams, sketches, technical drawings and graphs. Student has skills to use multipurpose tester and oscilloscope
3	<b>Social competencies</b>	Understands the need and knows the possibilities of lifelong learning. 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 own decisions
<b>Assumptions and objectives of the course:</b> To gain knowledge about electronics in modern means of transport. Understanding the principles of control systems based on sensors and executive units, especially engine control systems. To become familiar with operation principles of the most common sensors and executive units. To make students familiar with knowledge allowing to master methods of testing and measuring. To become aware of the necessity of applying the onboard diagnostic systems and understand its operation principles		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has knowledge of electrical engineering and electronics, knows and understands basic notions used in electricity and electronics - [K1A-W18] 2. Has knowledge of ecological issues connected with means of transport, knows the impact of transport means on natural environment pollution - [K1A_W24] 3. Has knowledge of transport means diagnostics, knows the essence, conditions, goals and problems connected with transport means diagnostics - [K1A_W25]		
<b>Skills:</b>		
1. Is able to gain informations from the scientific literature, internet and other sources, know how to integrate, interpret from acquired informations, reach conclusions, make and justify opinions - [K1A_U01] 2. Is able to make an analysis of technical objects design and construction, evaluate its usability in students own technical projects - [K1A_U10] 3. Is able to plan and carry out research experiment with use of proper measuring apparatus, is able to make measurements, interpret results and reach conclusions - [K1A_U07]		
<b>Social competencies:</b>		

1. Is aware of the necessity of knowledge improvement for whole professional life - [K1A\_K01]  
 2. Student understands the significance of engineer knowledge and performance for society development, appreciates social determination of technical projects - [K1A-K02]

<b>Assessment methods of study outcomes</b>		
Written or oral evaluation of student preparation level to the laboratory lesson. The evaluation of activity during class. Final written test		
<b>Course description</b>		
Basic informations about electrical measurements in transport means. Electronically controlled injection system of spark ignition engines. Common Rail and Unit Injection Pump systems for compression ignition engines. Investigations of sensors and executive units of electronic systems for means of transport. The usability of electronics for diagnostics realization in technical objects		
<b>Basic bibliography:</b>		
<b>Additional bibliography:</b>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Preparation to the laboratory classes	8	
2. Participation in laboratory classes	15	
3. Consolidation of knowledge	8	
4. Consultation connected with laboratory classes	2	
5. Preparation to the final test	2	
6. Participation in final test	2	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	37	1
Contact hours	19	0
Practical activities	37	1