

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Elective course III		Code 1010334281010331906
Field of study Automatic Control and Robotics	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 8
Elective path/specialty Automatic Control	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 14 Classes: - Laboratory: 16 Project/seminars: -		No. of credits 4
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		ECTS distribution (number and %)
Responsible for subject / lecturer: dr hab. inż. Konrad Urbański email: konrad.urbanski@put.poznan.pl tel. 61 6652 810 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	K_W11: Has a basic knowledge of metrology, knowledge of methods of measurement of electrical and non-electrical, known computational methods and tools necessary for analyzing the results of the experiment
2	Skills	K_U01: Able to critically use the information literature, databases and other sources, has the ability and inclination to raise and upgrade professional skills
3	Social competencies	K_K01: He understands the need to continuous training and professional skills development, personal and social, is able to inspire and organize the learning process of others
Assumptions and objectives of the course: Introduction to the electronic and information and communication systems used to control and manage the work of internal combustion spark ignition engines. Discussion of the principles of operation of ignition systems, introduction to the methods and means of diagnostics of engines and emission control, drawing attention to the ecological aspect of the use of internal combustion engines		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has theoretical knowledge of the basic principles of operation of electronic components, analog and digital, and electronic circuits and systems - [K_W12+++]		
Skills: 1. Can obtain information from literature, databases and other sources, has the ability and inclination to raise and upgrade professional skills - [K_U01++]		
Social competencies: 1. Understands the importance and impact of non-technical aspects of engineering including its impact on the environment and the resulting responsibility for the decisions - [K_K02+]		
Assessment methods of study outcomes		
Lecture: exam Lab: checking skills related to programming and assessment correct operation of microprocessor systems		
Course description		

<p>Lecture: History of the internal combustion engine, its construction and operation, how to create a fuel-air mixture, methods of quality management and the moment of ignition, sensors and actuators, ignition systems, diagnostics and emissions management, information and communication networks in vehicles</p> <p>laboratory: analysis of the work of microprocessor systems, programming characteristics of analog inputs and outputs, the evaluation and processing of input and output signals of the microprocessor system</p>		
<p>Basic bibliography:</p> <p>1. W.Zimmermann, R.Schmidgall,: ?Magistrale danych w pojazdach; Protokoły i standardy?, WKŁ 2008</p> <p>2. A. Herner, H.J Rieh: ?Elektrotechnika i elektronika w pojazdach samochodowych?, WKŁ 2008</p>		
<p>Additional bibliography:</p> <p>1. P. Karkoszka: ?Samochodowe niekonwencjonalne systemy zapłonowe?, WKŁ 1988</p> <p>2. Allan W. M. Bonnick: ?Automotive Computer Controlled Systems Diagnostic - tools and techniques?, Butterworth-Heinemann 2001</p> <p>3. ?Citroen&#38;Peugeot; Engine Management Systems, Haynes Garage Equipment?, Haynes Publishing 2002</p> <p>4. S. Luft: ?Podstawy budowy silników?, WKŁ 2003</p>		
<p>Result of average student's workload</p>		
<p>Activity</p>		<p>Time (working hours)</p>
<p>1. Lecture</p>		<p>14</p>
<p>2. Lab</p>		<p>16</p>
<p>3. preparation for laboratory exercises, preparation of reports</p>		<p>40</p>
<p>4. preparation for the exam</p>		<p>30</p>
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
<p>Total workload</p>	<p>100</p>	<p>4</p>
<p>Contact hours</p>	<p>50</p>	<p>2</p>
<p>Practical activities</p>	<p>50</p>	<p>2</p>