

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Electrical and electronic systems in industry and vehicles		Code 1010321261010324813
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 6
Elective path/specialty Electrical and Computer Systems in	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: 2 Classes: - Laboratory: 2 Project/seminars: -		No. of credits 5
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 Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: Dr inż. Karol Bednarek email: karol.bednarek@put.poznan.pl tel. 616652659 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		Responsible for subject / lecturer: Dr inż. Jarosław Jajczyk email: jaroslaw.jajczyk@put.poznan.pl tel. 616652659 Elektryczny ul. Piotrowo 3A, 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of electrical engineering, electronics and electrical machines.
2	Skills	Linking physics with the principles of operation of technical equipment. Interpretation of wiring diagrams. Combining electrical circuits. Collaboration in a team (group of laboratory).
3	Social competencies	Awareness of the importance and need for the use of electrical and electronic engineering work. The ability to expand its powers.
Assumptions and objectives of the course: Knowledge of both theoretical and practical problems associated with the operation and diagnosis of electrical and electronic equipment used in industry and motor vehicles.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. use of physical phenomena and principles of mechanics to understand and diagnose the operation of automotive accessories and industrial equipment - [K_W03+, K_W04+] 2. define the operating parameters of industrial equipment and occurring in vehicles - [K_W13++]		
Skills: 1. to analyze and evaluate the technical condition of equipment and electrical and electronic components used in industry and vehicles - [K_U05+, K_U11++] 2. assemble, run and diagnose basic devices and operating systems in vehicles - [K_U06+]		
Social competencies: 1. awareness of the need for electrical and electronic industry and vehicles, and the ability to communicate in a meaningful way knowledge - [K_K05+]		
Assessment methods of study outcomes		

<p>Lecture:</p> <ul style="list-style-type: none"> - assess the knowledge and skills demonstrated during the examination of a problematic, realized in the form of written and oral. <p>Laboratory:</p> <ul style="list-style-type: none"> - assessment of knowledge and skills related to the implementation of laboratory exercises, - checking and rewarding knowledge and skills presented in the course of activities. <p>Get extra points for the activity in the classroom, and in particular for:</p> <ul style="list-style-type: none"> - making attempts to solve the problems posed zjęciach, - ability to work as a team.
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Course description

Functional properties, specifications, designs and test methods for circuit elements: a static power supply (batteries) and dynamic (alternators), engine start, classical and electronic ignition systems, electronic fuel injection systems, lighting and signaling devices. Transmitters on the size of non-electrical quantities electrical systems used in the automotive (sensor: linear and angular displacement, speed and crankshaft position, temperature, pressure, air flow, and oxygen sensor) - construction, principle of operation, specifications and methods of diagnosis. Vehicle accessory systems.

Basic bibliography:

1. Herner A., Riehl H. J.: "Elektrotechnika i elektronika w pojazdach samochodowych", WKiŁ, Warszawa 2003.
2. Ocioszyński J.: "Zespoły elektryczne i elektroniczne w samochodach", WNT, Warszawa 1999.
3. Kasedorf J.: "Układy wtryskowe i katalizatory", WKiŁ, Warszawa 1998.
4. Kowalski B.: "Badania i diagnostyka samochodowych urządzeń elektrycznych", WKiŁ, Warszawa 1981.
5. Konopiński M.: "Elektronika w technice motoryzacyjnej", WKiŁ, Warszawa 1987.

Additional bibliography:

1. Sitek K.: "Diagnostyka samochodowa", Wydawnictwo AUTO, Warszawa 1999.
2. Gajek A., Juda Z., "Czujniki", WKiŁ, Warszawa 2008.
3. Denton T.: "Automobile electrical and electronic systems", Arnold, London 2000.
4. Praca zbiorowa: "Czujniki w pojazdach samochodowych. Informatory techniczne Bosch", WKiŁ, Warszawa 2010.

Result of average student's workload

Activity	Time (working hours)
1. participation in class lectures	30
2. participation in laboratory classes	30
3. participate in the consultations on the lecture	6
4. participate in the consultations on the lab	6
5. preparation for lecture classes	10
6. preparation laboratory	14
7. study reports	12
8. exam preparation	20
9. participation in the exam	4

Student's workload

Source of workload	hours	ECTS
Total workload	132	5
Contact hours	76	3
Practical activities	62	2