



Name of module/subject	Code
<b>Electric and electronic equipment of transportation means</b>	4/6

### COURSE DESCRIPTION CARD

Field of study: <b>Transport</b>	Training profile (general academic/practical): <b>practical</b>	Year / Semester: <b>II/4</b>
Specialization: <b>Logistics and transport technology</b>	Subject offered in: <b>English</b>	Course (obligatory/optional): <b>obligatory</b>
No. of lecture hours: <b>35</b> No. of self-studying hours: <b>15</b>		ECTS: <b>3</b> <b>1</b>
<b>Cycle of studies:</b> first	<b>Form of studies</b> (full time/weekends) Full time	<b>Field of studies</b> technical sciences, electronics and electrical engineering, vehicle technology, IC engines
Status of subject in curriculum (basic, specialized, other) <b>specialized</b>		(general academic, from other department) <b>general academic</b>
Unit providing the training: <b>Institute of Management and Transport</b>		
Lecturer in charge of the subject:  Piotr Krzymień, PhD, Eng. email: piotr.krzymien@put.poznan.pl tel. 61 424 2942 Instytut Zarządzania i Transportu ul. Ks. S. Wyszyńskiego 38, 62-200 Gniezno		
<b>Initial requirements in knowledge, skills, social competences:</b>		
1	<b>Knowledge:</b>	Student possesses a basic knowledge on fundamentals of physics, electrical and electronic engineering and knows construction and operation of a IC as well as functional systems of a mechanical vehicle
2	<b>Skills:</b>	Student should know how to associate information and conclude as well as effectively develop his knowledge in fields connected with vehicles and their electric and electronic equipment
3	<b>Social competences:</b>	Student should be conscious of the need of continuous improvement of his own knowledge about modern solutions of electronic systems. He should understand non-technical aspects and results of transport activity as well.
<b>The aim of the subject:</b> Acquaintance with principles and rules applied in electronic and electric technology, theoretical and practical problems associated with operation and diagnostics of electric and electronic systems of automotive vehicles.  Development of skills in recognition of electric circuit elements as well as definition of their parameters.		

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Acquirement of competence in diagnostics of failures in electric circuits and their parts occurring in automotive technology.

### Training outcomes

#### Knowledge

As a result of the training course a student is able to:

Reference to field-related training outcomes

1	Student should possess a basic knowledge on electronics and electric technology within the range of automotive applications. He knows basic topics about control and diagnostics of electric and electronic appliances used on vehicles.	<b>K_W03</b>
2	One should describe and explain operation of electric and electronic equipment of automotive transport means.	<b>K_W20</b>
3	Student should comprehend the knowledge about design of electric circuits and modeling of control systems.	<b>K_W26</b>

#### Skills

As a result of the training course a student is able to:

Reference to field-related training outcomes

1	Acquire information from domestic and foreign literature, data bases and other sources. Also carry out analysis of the obtained information and perform their interpretation and synthesis.	<b>K_U01</b>
2	Using the knowledge about electronic and electric technology one should analyze operation of selected electric and electronic systems met in automotive technology.	<b>K_U10</b>
3	Make use of elements of the on-board diagnostics one should be able to carry out check procedure of proper operation and find failures. Also carry out the necessary measurements, an adequate experiment and fixing of damaged element or section of electric circuit.	<b>K_U14</b>

#### Social competences

As a result of the training course a student is able to:

Reference to field-related training outcomes

1	Be conscious of the need for the continuous self-studying. To understand the social role of technical school graduate.	<b>K_K01</b>
2	Notice the essence and understand the non-technical aspects and results of transport engineer's activity and its influence on the environment as well as the necessity to take the responsibility for decisions taken.	<b>K_K02</b>
3	Think and act creatively in the field of application of modern electronic and electric devices found in automotive industry.	<b>K_K06</b>

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<b>Accepted grading criteria</b>			
<b>Local grade</b>	<b>Local definition</b>	<b>ECTS grade</b>	<b>ECTS definition</b>
5	Bardzo dobry [very good]– perfect knowledge, skills, competences	A	Celujący [exemplary] – extraordinary achievements
4,5	Dobry plus [good plus]– very good knowledge, skills, competences	B	Bardzo dobry [very good] – above average standards with some mistakes
4	Dobry [good] – good knowledge, skills, competences	C	Dobry [good] – general good work with some noticeable mistakes
3,5	Dostateczny plus [satisfactory plus] – satisfactory knowledge, skills, competences but with significant shortcomings	D	Zadowalający [satisfactory] – satisfactory but with significant mistakes
3	Dostateczny [satisfactory] – satisfactory knowledge, skills, competences but with numerous shortcomings (threshold 60% of the requirements)	E	Dostateczny [satisfactory] – outcomes meet minimal criteria
2	Niedostateczny [insufficient] – insufficient knowledge, skills and competences (below 60% of the requirements)	FX, F	Niedostateczny [insufficient] – basic shortcomings in material
<b>Assumed grading methods</b>			
<p><b>Diagnosing assessment:</b></p> <ul style="list-style-type: none"> <li>• Current control of knowledge in the preparation for the successive laboratory hours</li> </ul> <p><b>Formative assessment:</b></p> <ul style="list-style-type: none"> <li>• Evaluation of creativity and self-reliance observed during laboratory hours</li> </ul> <p><b>Summative assessment:</b></p> <ul style="list-style-type: none"> <li>• Credit on the basis of test consisting of several questions and schematic diagrams of electric circuits</li> </ul>			
<p><b>Curriculum content:</b></p> <p>Functional properties, operational parameters, technical solutions, diagnostic methods, typical failures of circuits of: supply and start, classic and electronic ignition systems, electronic injection systems of gasoline and diesel fuel, light and signaling equipment, elements of active and passive safety systems as well as comfort ones. Electric sensors of non-electric quantities used in automotive industry: design, principle of operation, parameters and diagnosing. Schematic diagrams of car electric installation. Data transmission bus.</p> <p><b>Self-studying:</b></p> <p>Repetition of knowledge acquired during lectures and classes. Analysis of electrical circuits carried out by the student himself.</p>			

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**Main bibliography:**

1. Herner A., Riehl H.J., Elektrotechnika i elektronika w pojazdach samochodowych, WKŁ, Warszawa 2004, 2008.
2. White Ch., Randall M., Kody usterek – poradnik diagnosty samochodowego, WKŁ, Warszawa 2008.
3. Ocioszyński J., Elektrotechnika i elektronika pojazdów samochodowych, WSiP, Warszawa 1996

**Supplementary bibliography:**

1. Bosch R., GmbH, Dieselmotor-Management: Systeme und Komponenten mit Partikelfilter, wyd. 4, R. Bosch, 2004.
2. Bosch R., GmbH, Autoelektrik, Autoelektronik: Systeme und Komponenten; Sensoren, Mikroelektronik, wyd.4 zmienione, R. Bosch, 2002.
3. Rokosch U., Układy oczyszczania spalin i pokładowe systemy diagnostyczne, WKŁ, Warszawa 2008.
4. Bolkowski S., Elektrotechnika, WSiP Warszawa 2007.
5. Merkiś J., Mazurek S., Pokładowe systemy diagnostyczne pojazdów samochodowych, WKŁ, Warszawa 2004.
6. Bosch R., GmbH, Fachwörterbuch Kraftfahrzeugtechnik, 3.Auflage, 2005
7. Czujniki w pojazdach samochodowych - Informator techniczny BOSCH, WKŁ, Warszawa 2002

**Student's involvement**

Form of activity	Hours	ECTS
Total number of hours	50	2
Hours requiring direct contact with a lecturer	35	1
Activities requiring self-studying	15	1