COURSE DESCRIPTION CARD - SYLLABUS

Course name
Lighting engineering in electromobility [S1Elmob1>TŚwE1]

Course

Field of study
Electromobility

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

A student starting this course should have basic knowledge of electrical engineering, metrology and physics. The information on visible radiation will be especially useful. The ability to effectively self- educate in a field related to the chosen field of study.

Course objective

Provide students with basic information on lighting engineering, with particular emphasis on issues related to transport and vehicles.

Course-related learning outcomes

Knowledge:
1. Has advanced knowledge of lighting engineering necessary to understand the basic physical phenomena occurring in the elements and systems of electromobility.
2. Has an organized knowledge of the impact of lighting on road safety.

3. Knows and understands the processes taking place in the life cycle of lamp systems and lighting fittings in electromobility systems.

Skills:
1. Can use literature sources, integrate obtained information, evaluate it, interpret it and draw conclusions in order to solve problems related to lighting enginnering in electromobility.
2. Can, when formulating and solving tasks related to electromobility, see their systemic and non-technical aspects, including environmental, economic and legal.
3. Is able to design and develop the documentation of an engineering task in accordance with the given specification and with the use of appropriate methods in the field of lighting roads and pedestrian crossings.

Social competences:
1. Understands the importance of knowledge in solving technical problems. Is aware of the intense technological progress in lighting engineering and the related need to use the knowledge of experts when solving engineering tasks beyond their own competences.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge acquired during the lecture will be verified by the final test. The test consists of 15-20 questions (test and open-ended), with different scores. Passing threshold: 51% of points. The completion of the questions is available on the Department"s website and on the eLearning Moodle platform.

Programme content

Basic lighting engineering, psychophysiology of driver vision, photometric, spectrophotometric and colorimetric measurements, lighting equipment used in electromobility. Basics of colorimetry. Thermal issues in lighting equipment, road
lighting, paramiters of road signs .

Course topics

Basic photometric quantities and laws of light engineering. Functioning of the visual system, the phenomenon of glare, visual acuity of the driver. Conditions for photometric measurements, measurement of luminous flux, luminous intensity, illuminance, luminance. Road lighting - classes of lighting, requirements, methods of realization, measurement of lighting quality. Lighting of pedestrian crossings - importance of contrast, recommendations, standard illumination, dedicated lighting, methods of implementation, measurement of lighting quality.
Basics of colorimetry. Light sources used in the automotive industry.
Definition of thermal parameters of light sources used in cars as replacements for incandescent sources, methods of intensifying heat transfer, patent solutions used by various manufacturers. Discussion of the photometric and colorimetric parameters that should be met by coatings for road signs, vertical markings and traffic lights based on current legal conditions.

Teaching methods

Lecture: multimedia presentation (drawings, photos, charts) supplemented with examples given on the board.

Bibliography

Basic
1. Żagan W. Podstawy techniki świetlnej. Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej, 2014.
2. Trzeciak K. Diagnostyka samochodów osobowych rozdz. 8. Warszawa, WKŁ, 2008.
3. Żagan W. Oprawy oświetleniowe Kształtowanie rozsyłu strumienia świetlnego i rozkładu luminancji. Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej, 2012.
4. Demidowicz R.: Oświetlenie (z cyklu: W moim samochodzie). Warszawa, WKŁ 2000.

5. Regulations relating to the approval of lighting devices for use in vehicles.
6. Catalog cards and subject standards.
Additional
1. Kaźmierczak P., Wpływ regeneracji klosza i odbłyśnika reflektora na właściwości fotometryczne świateł mijania, Przegląd elektrotechniczny, wrzesień 2016, nr 9, str. 61-64.
2. Kaźmierczak P., Badania fotometryczne reflektorów samochodowych po 10 latach eksploatacji, Przegląd elektrotechniczny, sierpień 2014, nr 8, str. 61-64.

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00