COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of Lighting Engineering [S1Eltech1>PTS]

Course

Field of study
Electrical Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
practical

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr inż. Małgorzata Zalesińska
malgorzata.zalesinska@put.poznan.pl

dr hab. inż. Krzysztof Wandachowicz
krzysztof.wandachowicz@put.poznan.pl

Lecturers

Prerequisites

The student starting this course should have a basic knowledge of physics, with particular regard to optical radiation. He should also have the skills to acquire knowledge in the field of phenomena associated with optical radiation. Basic skills in measuring electrical and non-electrical parameters. The ability to effectively self-study in a field related to the chosen field of study.

Course objective

Providing students with basic information on visible radiation and the functioning of the eye, basic light quantities, basic laws of lighting technology, construction. To familiarize students with the construction, principle of operation and basic characteristics of electric lamps. Discussion of the basic normative requirements in the field of interior lighting, emergency lighting and road lighting.

Course-related learning outcomes

Knowledge:

1. Has basic knowledge of solar radiation
2. Has basic knowledge of lighting technology, knows and understands the relationships between basic lighting parameters. Knows and understands the basic laws of lighting engineering.
3. Knows the construction and principle of operation of photoelectric cells, photoelectric current meters, lux meters.
4. Knows and understands the principles of determining and graphically presenting components of illuminance.

Skills:
1. Is able to choose the most optimal design solution due to the adopted utility and economic criteria.
2. Is able to use his knowledge in the selection of measuring equipment for measuring electrical and photometric parameters.
3. Is able to assess the usefulness of basic methods and tools for measuring photometric parameters.

Social competences:
1. Student understands the importance of knowledge in solving technical problems. Is aware of the intense technological progress in technology and the related need for systematic training.
2. Is aware of the contribution of their own work for the benefit of their colleagues and the workplace, is able to cooperate in a team and take over various functions during the implementation of the task.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Knowledge acquired during the lecture will be verified by the colloquium written on 15 lectures. The test consists of 25-36 questions (test and open), variously scored. Credit threshold: 51% points. Final issues, based on which questions sent to students by e-mail are developed using the university e-mail system.
Skills acquired as part of the laboratory classes are verified on the basis of a minimum of two reports from laboratory exercises performed. Assessment threshold: positive assessment of each study.

Programme content

Lecture: Basic photometric quantities and laws of light technology. Psychophysiology of vision. Fundamentals of photometry. Fundamentals of lighting design. Thermal issues in lighting equipment. Lighting equipment: electric lamps and luminaires.
Laboratory on psychophysiology of vision, measurement of basic photometric quantities,.

Course topics

Lectures: Visible radiation. The structure and functions of the eye. Basic lighting parameters (luminous flux, luminous intensity, illumination, luminance). Basic laws of lighting engineering .Luminous flux calculations based on the curve of luminous intensity. Determination of illuminance from photometric law of distance. Luminous flux measurement, photometric solid intensity. Color rendering index, color temperature. Structure, principle of operation, basic characteristics of electric lamps, construction, parameters of luminaires.Normative requirements in interior and exterior lighting.
Defining heat flow paths, basic thermokinetic parameters, presenting thermograms and temperature measurements for real lighting systems with diode sources and diode substitutes for incandescent and fluorescent lamps. Defining the parameters that should be maintained when measuring the temperature of luminaire, including parameter of the draft-free chamber. Discussion of temperature requirements for luminaires of various applications in accordance with normative requirements.

Laboratory: Practical exercises in the field of: visual acuity tests in various lighting conditions, luxmeter tests and measurement of light intensity distribution, determination of luminous intensity, testing of daytime running lights, measurement of lamp luminous flux, testing of emergency lighting. Basics of interior lighting design.

Teaching methods

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

Laboratory exercises: performing practical tasks as instructed by the teacher. Discussion of the results obtained. Work with the program designed for lighting design.

Bibliography

Basic
1. Żagan W.: Podstawy techniki świetlnej. Ofic. Wyd. Politechniki Warszawskiej, Warszawa 2005
2. Bąk J., Pabjańczyk W.: Podstawy techniki świetlenej. Wyd. Politechniki Lódzkiej, Łódź 1994
3. Laboratorium z techniki świetlnej. Praca zbiorowa. Wyd. Politechniki Poznańskiej nr 1792, Poznań 1994
Additional
1. Technika Świetlna ‘09. Poradnik- Informator. Wyd. PKOś, Warszawa 2009
2. Hauser J.: Elektrotechnika. Podstawy elektrotermii i techniki świetlnej, Wyd. PP, Poznań, 2006
3. European standards.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00