



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basic of Lighting Design [N1Eltech1>A-PPO]

### Course

Field of study

Electrical Engineering

Year/Semester

4/8

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

20

Other

0

Tutorials

0

Projects/seminars

10

### Number of credit points

4,00

### Coordinators

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### Lecturers

### Prerequisites

A student starting this course should have a basic knowledge of lighting engineering. Basic skills in measuring electrical and photometric quantities. The ability to effectively self-study in a field related to the chosen field of study.

### Course objective

Providing students with basic information on normative requirements in the field of lighting and lighting design principles. To acquaint students with practical aspects of interior lighting, road lighting and lighting in sport. The rules for the selection of lighting equipment. Developing skills in creating multi- criteria lighting concepts and choosing the most optimal one based on the adopted criterion.

### Course-related learning outcomes

Knowledge:

1. Has basic knowledge about the principles of interior lighting design. Knows normative requirements

for indoor and outdoor lighting.

2. Has extended and in-depth knowledge of physics in the field of electric power and optics, necessary to understand the basic physical phenomena occurring in lighting engineering.
3. Has structured knowledge in the field of measuring basic lighting parameters.

#### Skills:

1. Is able to plan and carry out simulation of indoor lighting of illuminance distributions. Can present the results obtained in numerical and graphic form, interpret them and draw the right conclusions.
2. Is able to use the catalogs of lighting equipment available in printed and on-line versions, compare and evaluate the technical parameters of lamps and luminous, as well as formulate and justify opinions, discuss about them.
3. Is able to use his knowledge in the selection of measuring equipment in order to assess the quality of indoor and outdoor lighting. Is able to interpret measurement results and assess them with normative requirements.

#### 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 necessity of systematically expanding knowledge and using modern lighting solutions in designing.
2. Is aware of the contribution of own work for the good of the team and the work establishment. Is able to cooperate in a team and take over various functions during the implementation of a given task.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Knowledge acquired as part of the lecture will be verified by the colloquium passed on the last lecture. The test consists of 15-25 questions (test and open), variously scored. Pass threshold: 51% points. Final issues, based on which questions sent to students by e-mail are developed using the university e-mail system or placed on the eKursy platform.

Skills acquired as part of the laboratory are verified on the basis of one test report and one presentation containing the analysis of the results obtained, the conclusions of the measurements and a discussion regarding the results obtained. Assessment threshold: positive assessment of report and presentation.

Skills acquired as part of the project exercises are verified on the basis of the lighting design of the object indicated by the teacher and discussion of the results obtained. Assessment threshold: positive assessment of the completed project.

### Programme content

Lecture: Psychophysiology of vision. General and specific principles of lighting design. Normative requirements from outdoor lighting.

Laboratory: Practical exercises on the study of the psychophysiology of vision, assessment of the quality of lighting of workplaces.

Project: Creating a multi-criteria concept for lighting office spaces, performing lighting calculations.

Discussion, analysis of the results obtained.

### Course topics

Lecture: In-depth knowledge of luminous quantities, laws of light technology and psychophysiology of vision. Functioning of the organ of vision. The phenomenon of glare and its effect on the visual process. Quantitative and qualitative lighting parameters. Criteria for lighting design. General and specific principles of lighting design. Normative requirements of outdoor lighting. Road lighting - lighting classes, requirements, measurement of road lighting quality. Light pollution - what it is, causes, effects, ways to reduce, legal and normative requirements.

Laboratory: Practical exercises on visual performance testing, threshold contrast, effects of short-term glare on the dark adaptation process, stereoscopic vision testing, assessment of the quality of lighting of a local road and a car park, assessment of the quality of lighting of indoor workplaces using a classroom as an example. Discussion, analysis of the results obtained.

Project: Creating a multi-criteria concept for lighting office spaces with monitors, performing lighting design. Discussion, analysis of the results obtained.

## Teaching methods

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

Laboratory: Performing practical tasks under the supervision of the lecturer.

Project: Work with the program designed for lighting design. Work with catalogists of light sources and luminous.

## Bibliography

### Basic

1. Żagan W.: Podstawy technik świetlnej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005.
2. Pracki P.: Projektowanie oświetlenia wnętrz, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2011.
3. Wiśniewski A.: Elektryczne źródła światła, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2010.
4. Bąk J.: Technika oświetlania : wybrane zagadnienia oświetlania wnętrz Stowarzyszenie Elektryków Polskich. Centralny Ośrodek Szkolenia i Wydawnictw, Warszawa 2014.

### Additional

1. Internet databasej :[www.licht.de](http://www.licht.de)
2. Filipek M., Cyrynger J.: Badanie oświetlenia, DASL Systems, Kraków 2017
3. Materials for laboratory classes available at eKursy platform.
4. European standards.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	105	4,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	2,00