STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Lighting engineering and electroheat**		Code **1010315331010321545**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **general academic**	Year /Semester **2 / 3**
Elective path/specialty **Distribution Devices and Electrical**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **20** Classes: **-** Laboratory: **20** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of lighting engineering and electroheat
2	**Skills**	The ability to acquire knowledge in the field of lighting technology and electroheat. Measuring skills of electrical and non-electrical. Ability to effectively self-education in a field related to the chosen field of study.
3	**Social competencies**	Awareness of the need to broaden their competence, willingness to work together as a team.

Assumptions and objectives of the course:

Systematize the knowledge of the psychophysiology of vision, lighting equipment, photometry, lighting design. Mastering of the photometric measurements.

Increasing knowledge of the various electroheat methods and heater devices used in the various electro-technological processes and mastering skills in temperature measurement.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Describe the factors that affect the quality of vision. Characterize and select the lighting equipment needed to carry out a variety of lighting concepts. Assess the quality of workplace lighting, describe the method of measuring of the photometric paramiters. - [K_W13 +++, K_W11+]

2. List and define all the electroheat methods for heating charges, evaluate the suitability of different methods of electroheating loads to carry out these processes. Describe the construction of various temperature meters and methods of measurement. - [K_W14 +++, K_W11 +]

Skills:

1. Use knowledge of the psychophysiology of vision, lighting design rules and criteria for the selection of lighting equipment to create the overall concept of workplace lighting. Prepare and carry out measurements of the light and do the analysis of the results. - [K_U08 ++, K_U03 +++]

2. Apply knowledge of methods and means of electrothermal heating loads to choose the general concept of heating the charge to a specific temperature. - [K_U19 +]

3. Build up electric thermometers, temperature measurements carried out and analyze the results. - [K_U02 ++]

Social competencies:

1. Proceedings in accordance with specified procedures. Awareness of responsibility for decision making. - [K_K02++]

Assessment methods of study outcomes

Lecture:

assess the knowledge and skills listed on the written test.

Laboratory:

assess the knowledge and skills related to the activities exercises

assessment report performed exercise.

Extra points for the activity in the classroom, especially for the following:

ability to work within a team performing a task specific practice in the laboratory;

comments related to the improvement of teaching materials;

developed aesthetic diligence reports and jobs in the self-study.

Course description

Psychophysiology of vision. Photometry and colorimetry. Photometric properties of materials. The construction, operation, use, parameters, characteristics of electric lamps and luminaires. The rules and criteria for lighting design.

Electroheat transformation and Electroheat. Methods of electroheating (resistive, electrode, induction, arc, plasma, capacitive, microwave, electron, photon, fluorescent, ultrasound), and its implementation in electrothermal technology. Direct and indirect heat devices. Basic rights of thermokinetics. Meters and temperature metrology.

Update 2017:

Changes in the requirements of road and emergency lighting.

Heat transfer in lighting equipment.

Applied methods of education:

The lecture - multimedia presentations (including drawings, photos, animations) supplemented by examples given on the whiteboard, takes into account student activity during the course of the final assessment, theory presented in close connection with the practice.

Laboratories - team work, discussion of the results of the research, detailed reviews of the report by the lead and discussion of the comments.

Basic bibliography:

1. Żagan W.: Podstawy techniki świetlnej. Ofic. Wyd. Pol. Warszawskiej, Warszawa 2005.

2. Dybczyński Wł.: Miernictwo promieniowania optycznego. Wyd. Pol. Białostockiej, Białystok 1996.

3. Materiały dydaktyczne http://lumen.iee.put.poznan.pl.

4. Felhorski W., Stanioch W.: Kolorymetria Trójchromatyczna. WNT, Warszawa 1973.

5. . Hauser J.: Elektrotechnika. Podstawy elektrotermii i techniki świetlnej. Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

6. Hering M.: Podstawy elektrotermii cz. I. WNT, Warszawa 1992.

7. Hering M.: Podstawy elektrotermii cz. II. WNT, Warszawa 1998.

8. Hering M.: Termokinetyka dla inżynierów. WNT, Warszawa 1980.

9. Michalski L., Eckersdorf K., Kucharski J.: Termometria. Przyrządy i pomiary. Wydawnictwo Politechniki Łódzkiej, Łódź 1998.

10. Bąk J.: Technika świetlna. Wybrane zagadnienia oświetlenia wnętrz. COSiW, Warszawa 2014

11. Normy przedmiotowe

Additional bibliography:

1. Bąk J., Pabjańczyk W.: Podstawy techniki świetlnej. Wyd. Pol. Łódzkiej, Łódź 1994.
2. Laboratorium z techniki świetlnej. Praca zbiorowa. Wyd. Pol. Poznańskiej. nr 1792, Poznań 1989.
3. Mielicki J.: Zarys wiadomości o barwie. Fundacja Rozwoju Polskiej Kolorystyki. Łódź 1997.
4. Hauser J., Domke K.: Laboratorium elektrotermii. Wyd. Pol. Pozn. nr 1487, Poznań 1989.
5. Materiały dostępne na stronie: www.licht.de
6. Poradnik-Informator: Technika Świetlna'09, tom 2 i 3, PKOŚ i SEP, Warszawa 2013
7. Żagan W.: Iluminacja Obiektów. Oficyna Wydawnicza PW, Warszawa 2003
8. Zalesińska M.: Oświetlenie hal magazynowych. Kwartalnik: Nowoczesne hale 2/2017, str 66-71, ISSN 1899-8224
9. Zabłocka J., Zalesińska M., Górczewska M.: Badanie zmian parametrów eksploatacyjnych wybranych lamp do użytku domowego Poznan University of Technology, Academic Journals, Electrical Engineering, Issue 92, Poznan 2017, s. 166-167, ISSN 1897-0737, DOI: 10.21008/j.1897-0737.2017.92.0015
10. Zalesińska M, Górczewska M.: Comparative study of lighting quality and energy efficiency for various road lighting situations, VI. IEEE Lighting Conference of the Visegrad Countries LUMEN V4, Karpacz, Poland, September 13 - 16, 2016, LumenV4 Proceedings on USB Flashdrive pp. 205-209.
11. Hauser J., Skrzypczak P., Czaplicki A., Wesołowski M.: Analogue RC model for temperature controller testing. Poznan University of Technology, Academic Journals, Electrical Engineering, Issue 13, 2015, pp 132-142
12. Hauser J., Skrzypczak P., Wesołowski M.: Adaptacja programów wspomagających projektowanie oświetlenia do symulacji radiacyjnego przekazywania ciepła. PES-10 : X Jubileuszowa Konferencja Naukowo - Techniczna "Postępy w Elektrotechnice Stosowanej", Kościelisko, 15-19 czerwca 2015, s. 195-198.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lecture classes.	20
2. Participation in laboratory activities.	20
3. Participation in consultation.	25
4. Homeworks	20
5. Participation for colloquium	30
6. Colloquium	2

Student's workload

Source of workload	hours	ECTS
Total workload	117	4
Contact hours	65	2
Practical activities	40	2