

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Photometry		Code 1010321371010320372
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Lighting Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: 15 Project/seminars: 15		No. of credits 5
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: Małgorzata Zalesińska Ph.D. email: Malgorzata.Zalesinska@put.poznan.pl tel. 61 6652398 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge of the basics of lighting engineering: the calculation and the measurement of light parameters, lighting equipment.
2	Skills	The ability to use knowledge in lighting engineering to carry out computations, measurement and evaluation of lighting parameters. Ability to effectively self-education in a field related to the chosen field of study
3	Social competencies	Is aware of the need to broaden their competence, willingness to work together as a team.
Assumptions and objectives of the course: Learning basic ways and methods of photometry, spectrophotometry		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Describe the conditions of photometric measurements. The source of errors arising from photometric measurements. Describe the methods for photometric measurements. Describe the principles of photometers. - [[K_W05 ++, K_W14 +, K_W15 +++]]		
Skills: 1. Use the appropriate method for measuring photometric parameters. Perform photometric measurements of the parameters. Analyze the results. Estimate the errors arising in the course of photometric measurements. - [[K_U02 +++, K_U14 +++]]		
Social competencies: 1. Student understands and knows the need continuous training opportunities, improving professional skills, personal and social. Able to work in a group. Able to share and coordinate the work between team members. - [[K_K03 ++]]		
Assessment methods of study outcomes		

<p>Lecture: assess the knowledge and skills listed on the written exam, student activity is taken into account when giving a final grade</p> <p>laboratory exercises: assess the knowledge and skills associated with the implementation of the tasks your practice, the assessment report performed exercise.</p> <p>Project: evaluate the knowledge and skills associated with the implementation of the project.</p> <p>Get 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 tasks,the self-study.</p>
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Course description

<p>Terms of photometric measurements. Construction and operation photometers. Calibration of the photometers. Photometric calibration patterns. Basic methods and procedures for carrying out the measurement of photometric and spectrophotometric parameters. Source of errors in the photometry. Analysis of errors and irregularities measurement uncertainty. Practical determination of basic photometric diversity.</p> <p>Update 2017: Use of matrix luminance meters in measurements</p> <p>Applied methods of education: Lecture with multimedia presentation (including drawings, photos, videos) supplemented by examples on the blackboard, theory presented in close association with practice, presentation of a new topic preceded by a reminder of related content, known to students from other subjects. Laboratory - detailed review of reports by leading labs, discussion of comments, team work. Projects-analysis of various aspects of solving problems, teamwork, case study.</p>
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<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Dybczyński Wł.: Miernictwo promieniowania optycznego. Wyd. Pol. Białostockiej, Białystok 1996. 2. Helbig E: Podstawy fotometrii. WNT, Warszawa 1975. 3. Laboratorium z techniki świetlnej. Praca zbiorowa. Wyd. Pol. Pozn. nr 1792, Poznań 1989. 4. Normy przedmiotowe 5. Publication CIE 121-1996: The Photometry and Goniophotometry of Luminaires 6. Publication CIE 069-1987: Methods of Characterizing Illuminance Meters and Luminance Meters

<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Felhorski W., Stanioch W.: Kolorymetria trójchromatyczna. WNT, Warszawa 1973. 2. Żagan W.: Podstawy techniki świetlnej. Ofic. Wyd. Pol. Warszawskiej, Warszawa 2005 3. Publication CIE 198:2011: Determination of Measurement Uncertainties in Photometry 4. Szvedek St, Zalesińska M., Górczewska M.: Ocena parametrów fotometrycznych, kolorymetrycznych i elektrycznych wybranych zamienników żarówek tradycyjnych 100W, Poznan University of Technology, Academic Journals, Electrical Engineering, Issue 92, Poznan 2017, s. 153-164, ISSN 1897-0737, DOI 10.21008/j.1897-0737.2017.92.0014 5. 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 6. Sawicki D and Wolska A, Discomfort glare prediction by different methods, Lighting Research and Technology, 2015, 0:1-14, DOI: 10.1177/1477153515589773. 7. Blaszczyk UJ. Method for evaluating discomfort glare based on the analysis of a digital image of an illuminated interior. Metrology and Measurement Systems, vol. 20, issue 4, 2013, pp. 623-634, DOI:10.2478/mms2013-0053.

Result of average student's workload

Activity	Time (working hours)
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1. Participation in lecture classes.	15	
2. Participation in laboratory activities.	15	
3. Participation in consultation	45	
4. Homework	15	
5. Participation in project activities	15	
6. Preparation the project	10	
7. Preparation for colloquium	15	
8. Colloquium	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	135	5
Contact hours	92	3
Practical activities	68	3