

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Lighting equipment</b>		Code <b>1010321361010321040</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>3 / 6</b>
Elective path/specialty <b>Lighting Engineering</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Krzysztof Wandachowicz email: Krzysztof.Wandachowicz@put.poznan.pl tel. 61 6652397 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Knowledge of the basics of lighting engineering: the calculation and measurement of lighting quantities, lighting equipment and general requirements for lighting design. Basic knowledge of computer science, physics, electrical engineering and thermokinetics.
2	<b>Skills</b>	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	<b>Social competencies</b>	Is aware of the need to broaden their competence, willingness to work together as a team.
<b>Assumptions and objectives of the course:</b> The student should obtain basic knowledge of light generation at lamps, structures, operates and design of incandescent filament lamps and discharge lamps, structure, characteristics, theoretical fundamentals of luminaires.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. Can describe and explain the operation of the lamps and luminaires. Capable of detecting lamps from the electrical and photometric characteristics. - [K_W03 ++, K_W05 ++, K_W15 +++]		
<b>Skills:</b> 1. Can assess the usefulness of lamps and luminaires. - [K_U05 ++, K_U14 ++]		
<b>Social competencies:</b> 1. Is aware of and understands the importance and impact of non-technical aspects of electrical engineering activities, including the impact of light and lighting on the environment and the consequent responsibility for decisions. Can work in a group. Can coordinate the work between team members. - [K_K01 ++]		
<b>Assessment methods of study outcomes</b>		
Oral and written examination, laboratory reports.		
<b>Course description</b>		

<p>Parameters and characteristics of lamps. Incandescent filament lamps (vacuum, gas-filled, tungsten halogen) ? structures, parameters and characteristics. Fluorescent lamps ? basic principles, structures, characteristics, feed systems. High intensity discharge lamps (high pressure mercury, sodium, metal halide lamps) ? basic principles, structures, characteristics, feed systems. LED - basic principles, structures, characteristics. Systematic of luminaires. Light management systems. Update 2017: Technical characteristics of LEDs currently available on the lighting market. Applied methods of education: lectures - lecture with multimedia presentation (including drawings, photographs, animations, sound, video) supplemented administered examples on the board; lecture conducted in an interactive way of formulating questions to a group of students or indicated specific students.</p>		
<p><b>Basic bibliography:</b></p> <ol style="list-style-type: none"> <li>1. Technika Świetlna. Poradnik. PWT, Warszawa 1960.</li> <li>2. Bąk J., Pabiańczyk W.: Podstawy techniki świetlnej. Wyd. Pol. Łódzkiej, Łódź 1994</li> <li>3. Żagan W.: Podstawy techniki świetlnej. Ofic. Wyd. Pol. Warszawskiej, Warszawa 2005</li> <li>4. Wiśniewski A.: Elektryczne źródła światła. Oficyna Wydawnicza Politechniki Warszawskiej. Wydanie I (2010)</li> <li>5. Philips, Lighting Manual. Wyd.V 1993 r.</li> </ol>		
<p><b>Additional bibliography:</b></p> <ol style="list-style-type: none"> <li>1. Technika Świetlna ?09. Poradnik ? Informator. Wyd. PKOś, Warszawa 2009</li> <li>2. Lighting Handbook, Reference &amp;#38;#38;#38;Application. IES of Nofth America, New York 2010</li> <li>3. Wandachowicz K.: Charakterystyki techniczne diod świecących. VII Konferencja Naukowo-Techniczna z cyklu Energooszczędność w oświetleniu n.t. Technika Świetlna 2016, Poznań 10.05.2016, s. 27?32.</li> <li>4. Wandachowicz K., Michałowska N., Taisner M.: Zalety stosowania diod świecących w lampach do użytku domowego oraz w oprawach oświetleniowych, Poznan University of Technology, Academic Journals, Electrical Engineering, 2015, Iss. 83, s. 203?211.</li> </ol>		
<p><b>Result of average student's workload</b></p>		
<p><b>Activity</b></p>	<p><b>Time (working hours)</b></p>	
1. Participation in lecture classes	30	
2. Participation in consultation	5	
3. Exam preparation	30	
<p><b>Student's workload</b></p>		
<p><b>Source of workload</b></p>	<p><b>hours</b></p>	<p><b>ECTS</b></p>
Total workload	65	2
Contact hours	35	1
Practical activities	0	0