

## COURSE DESCRIPTION CARD

The name of the course/module <b>BUILDING PHYSICS - LIGHTNING</b>		Code <b>A_P_1.6_011</b>
Main field of study <b>ARCHITECTURE</b>	Educational profile (general academic, practical) <b>general academic</b>	Year/ Semester <b>III/6</b>
Specialization <b>-</b>	Language of course: <b>Polish</b>	Course (core, elective) <b>core</b>
Hours Lectures: <b>30</b> Classes: <b>-</b> Laboratory classes: <b>-</b> Projects / seminars: <b>-</b>		Number of points <b>2</b>
Level of qualification: <b>I</b>	Form of studies (full-time studies/part-time studies) <b>Full-time studies</b>	Educational area(s) ECTS distribution (number and %) <b>Technical Sciences 2 100%</b>
Course status in the studies' program (basic, directional, other) <b>directional</b>		(general academic, from a different major) <b>-</b>
<b>Lecturer responsible for course:</b> <b>dr inż. Artur Nawrowski</b> e-mail: artur.nawrowski@put.poznan.pl Faculty of Architecture ul. Nieszawska 13C, 61-021 Poznań tel.: 61 665 32 60		<b>Lecturer:</b> <b>dr inż. Artur Nawrowski</b> e-mail: artur.nawrowski@put.poznan.pl Faculty of Architecture ul. Nieszawska 13C, 61-021 Poznań tel.: 61 665 32 60
<b>Prerequisites defined in terms of knowledge, skills, social competences:</b>		
1	<b>Knowledge:</b>	<ul style="list-style-type: none"> <li>• student has explicit, theoretically based knowledge including the key issues of light technique,</li> <li>• student has basic knowledge of the role and importance of artificial lighting in the architectural designing and urban planning,</li> <li>• student has knowledge required for the understanding of social, economic, legal and other determinants outside the engineering field of the realization of artificial lighting systems in the life areas and functioning of the human,</li> </ul>
2	<b>Skills:</b>	<ul style="list-style-type: none"> <li>• student can acquire information from field specific literature, data bases and other properly selected sources in Polish and English, can integrate the acquired information, interpret and critically assess the said information, as well as draw conclusions and come up with opinions supported with satisfactory reasons,</li> <li>• student can carry out critical analysis of the manner of operation and assess the existing solutions, systems and processes,</li> <li>• can communicate using different IT tools in the professional environment and in other environments,</li> </ul>
3	<b>Social competences:</b>	<ul style="list-style-type: none"> <li>• student understands the need for lifelong learning; can inspire and organize process of learning other people,</li> <li>• understanding of the need to broaden the competences, readiness to work together in a group,</li> </ul>
<b>Objective of the course:</b> The objective of the course is provide knowledge of: <ul style="list-style-type: none"> <li>• perception and psychophysiology of view,</li> <li>• the criteria of lighting,</li> <li>• basic photometric magnitudes using in the normalization of lighting and formulating lighting principles and recommendations (e. g. in illumination of architectural facilities),</li> <li>• issues of reaction of light with matter, that are important from the viewpoint of designing the architectural and urban planning lighting,</li> <li>• basic concepts concerning the technical, photometric and colorimetric aspects of lighting equipment,</li> <li>• basics of lighting equipment (luminaries and light sources), using in typical lighting systems and solutions,</li> <li>• rules for the selection of equipment to realization of lighting tasks,</li> <li>• normalization of architectural interiors with electric (artificial) light,</li> <li>• issues of measurements and normalization and calculation of road lighting,</li> <li>• the illumination of architectural facilities,</li> <li>• calculation, simulation and visualization of lighting for design needs,</li> </ul>		

<ul style="list-style-type: none"> <li>basic tools of information technology realization of numerical and visualization lighting calculation.</li> </ul>		
<b>Learning outcomes</b>		
<b>Knowledge:</b>		
W01	has knowledge required for the understanding of social, economic, legal and other determinants outside the engineering field of the engineering activities and has basic knowledge of quality management	AU1_W01
W02	has basic knowledge connected with professional ethics of an architect	AU1_W04
W03	has basic knowledge of mathematics, descriptive geometry, the theory of structures, strength of materials and building physics,	AU1_W06
<b>Skills:</b>		
U01	student can acquire information from field specific literature, data bases and other properly selected sources in Polish and English, can integrate the acquired information, interpret and critically assess the said information, as well as draw conclusions and come up with opinions supported with satisfactory reasons,	AU1_U01
U02	student can prepare and present oral presentations on issues related to architectural and urban lighting	AU1_U03
U03	can work individually and in a team, in this can organise his/her time properly as well as can undertake liabilities and meet the deadlines	AU1_U04
U05	can, when formulating engineering tasks and solving them, notice their social, historical, economic and legal aspects	AU1_U16
<b>Social competences:</b>		
K01	can work over a set task independently and can cooperate in a team, assuming a number of different roles therein; demonstrates responsibility in the work performance	AU1_K01
K02	student is aware of the importance of non-technical aspects and effects of engineering activities, in this impact upon the cultural environment and liability for environment affecting decisions	AU1_K05
K03	understands the need of continuous self-education (1st and 2nd degree studies, post-graduate studies) - improvement of professional, personal and social competences	AU1_K03
<b>The evaluation methods:</b>		
<p><b>Conditions for course credit and evaluation method. An important criterion of course assessment will be knowledge in the scope of presented course objective.</b></p> <p><b>Summative assessment:</b>  A series of lectures ends with written colloquium – in the form of variant multiple choice test with one descriptive question. Course credit from 50% of points + 1.  Final grading scale: 2,0;3,0; 3,5; 4,0; 4,5; 5,0.</p> <p><b>Positive grade for module depends on achieved by student all learning outcomes specified in the syllabus.</b></p>		
<b>Course contents</b>		
<ul style="list-style-type: none"> <li>perception and psychophysiology of view from the viewpoint of the used artificial lighting,</li> <li>lighting criteria and hierarchy of importance of lighting principles,</li> <li>basic photometric magnitudes as a tool of formulating lighting principles and recommendations and control of lighting parameters,</li> <li>reaction of light with matter as an important factor in the process of lighting design,</li> <li>technical aspects of lighting equipment,</li> <li>basics of lighting equipment (luminaries and sources of light), using in typical lighting systems and solutions,</li> <li>rules for the selection of equipment to realization of lighting roles,</li> <li>normalization of architectural interiors with electric (artificial) light,</li> <li>issues of measurements and normalization and calculation of road lighting,</li> <li>the theory of architectural facilities illumination,</li> <li>calculation, simulation and visualization of lighting for design needs,</li> <li>basic tools of information technology realization of numerical and visualization lighting calculation.</li> </ul>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>Bąk Jerzy, Pabjańczyk Wiesława, <i>Podstawy techniki świetlnej</i>, Nakład Politechniki Łódzkiej, Łódź 1994.</li> <li>Hauser Jacek, <i>Elektrotechnika. Podstawy elektrotermii i techniki świetlnej</i>, Wydawnictwo Politechniki Poznańskiej 2006.</li> <li>Mielicki Józef, <i>Zarys wiadomości o barwie</i>, Fundacja Rozwoju Polskiej Kolorystyki, Łódź 1997.</li> <li>Technika Świetlna '96 Poradnik-Informator, Praca zbiorowa członków Polskiego Komitetu</li> </ol>		

- Oświetleniowego Stowarzyszenia Elektryków Polskich, Warszawa 1996.
5. Żagan Wojciech, *Podstawy techniki świetlnej*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005.
  6. Żagan Wojciech, *Iluminacja obiektów*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003.
  7. PN-EN 12193:2002 (U) Oświetlenie stosowane w obiektach sportowych
  8. PN-EN 1838:2005 Zastosowanie oświetlenia. Oświetlenie awaryjne.
  9. PN-EN 12665:2003 (U) Światło i oświetlenie. Podstawowe terminy oraz kryteria określania wymagań dotyczących oświetlenia.
  10. PN-EN 13032-1:2005 (U) Światło i oświetlenie. Pomiar i prezentacja danych fotometrycznych lamp i opraw oświetleniowych. Część 1: Pomiar i format pliku.
  11. PN-EN 13032-2:2005 (U) Światło i oświetlenie. Pomiar i prezentacja danych fotometrycznych lamp i opraw oświetleniowych. Część 2: Prezentacja danych dla miejsc pracy wewnątrz i na zewnątrz budynków.
  12. PN-CEN/TR 13201-1:2005 (U) Oświetlenie dróg. Część 1: Wybór klas oświetlenia.
  13. PN-EN 13201-2:2005 (U) Oświetlenie dróg. Część 2: Wymagania oświetleniowe.
  14. PN-EN 13201-3:2005 (U) Oświetlenie dróg. Część 3: Obliczenia oświetleniowe.
  15. PN-EN 13201-4:2005 (U) Oświetlenie dróg. Część 4: Metody pomiarów parametrów oświetlenia.
  16. PN-IEC 60364 Instalacje elektryczne w obiektach budowlanych (norma wieloarkuszowa).
  17. Ustawa Prawo Energetyczne z dnia 10 kwietnia 1997 r. (Dz. U. z 1997 r. Nr 54, poz. 348 z późniejszymi zmianami).
  18. Zalecenia i wytyczne projektowe w zakresie luminancji i barwy w iluminacji

#### Supplementary bibliography:

1. Majkowski Konstanty, *Podstawy teoretycznej techniki oświetleniowej*, Państwowe Wydawnictwo Naukowe, Warszawa 1953.
2. Nawrowski A., *Dominanty świetlne w iluminacji wybranych obiektów architektonicznych*, Rozprawa Doktorska, Poznań: Politechnika Poznańska, 2010.
3. Oleszyński T., *Miernictwo techniki świetlnej*, PWN, Warszawa 1957.
4. Tomczewski Andrzej, Rozprawa doktorska „*Analiza rozkładu strumienia świetlnego we wnętrzach z uwzględnieniem wielokrotnych odbić*”, Poznań, grudzień 1998.

#### The student workload

Form of activity	Hours	ECTS
Overall expenditure	52	2
Classes requiring an individual contact with teacher	-	-
Practical classes	-	-

#### Balance the workload of the average student

Form of activity	Number of hours
participation in lectures	30 h
participation in classes/ laboratory classes (projects)	-
preparation for classes/ laboratory classes	-
preparation to colloquium/review	-
participation in consultation related to realization of learning process	3 -
preparation to the exam	19 h
attendance at exam	3 h

Overall expenditure of student:

**2 ECTS credits**

**52 h**

As part of this specified student workload

- activities that require direct participation of teachers: **30h**