



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

LIGHTING AND ACOUSTIC DESIGN 1

		Course
Field of study		Year/Semester
ARCHITECTURE		II/3
Area of study (specialization)		Profile of study
		general academic
Level of study		Course offered in
First-cycle studies		polish/english
Form of study		Requirements
full-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
	Projects/seminars	
Tutorials	30	

### Number of credit points

1

Lecturers	
Responsible for the course/lecturer: Ph. D. Artur Nawrowski (LIGHTING DESIGN) e-mail: artur.nawrowski@put.poznan.pl Wydział Architektury, J.Rychlewskiego 2 Street, 61-131 Poznań phone.: 61 665 32 60	Responsible for the course/lecturer: Ph. D. Artur Nawrowski e-mail: artur.nawrowski@put.poznan.pl mgr inż. arch. Aneta Biała e-mail: aneta.biała@put.poznan.pl mgr inż. arch. Alicja Witkowska e-mail: alicja.witkowska@put.poznan.pls

Prerequisites
1 Knowledge
<ul style="list-style-type: none"><li>the student has an orderly, theoretically founded general knowledge covering key issues in the field of lighting technology;</li><li>the student has a basic knowledge of the role and importance of artificial light in architectural and urban design;</li><li>the student has basic knowledge necessary to understand the social, economic, legal and non-technical conditions of the implementation of artificial light systems in the zones of human life and functioning.</li></ul>



## 2 Skills:

- the student is able to obtain information from literature, databases and other, properly selected sources in English, can integrate information, interpret it, as well as draw conclusions and formulate and justify opinions;
- the student is able to make a critical analysis of the way of functioning and evaluate the existing solutions, systems and processes;
- is able to communicate using various techniques in the professional environment and in other environments.

## 3 Social competences

- the student understands the need for lifelong learning, is able to inspire and organize the learning process of other people;
- understanding the need to expand their competences, readiness to cooperate within the team.

## Course objective

### Lighting design:

- learning about the formal and legal conditions of architectural illumination;
- learning about the stages of preparing the illumination concept and the importance of architectural and urban analyzes in the process of creating the concept;
- learning the basic tools and techniques for developing a technically correct concept of illumination;
- learning about computer-aided design of electric (artificial) lighting;
- gaining skills in the field of creating basic technical documentation of an illumination project based on a selected architectural object, including technical working drawings;
- gaining knowledge and skills in the field of designing illumination systems.

## Course-related learning outcomes

### Knowledge

A.W1. architectural design for the implementation of simple tasks, in particular: simple facilities taking into account the basic needs of users, single- and multi-family housing development, service facilities in residential complexes, public utility facilities in an open landscape or in an urban environment;

A.W2. urban planning in the field of implementation of simple tasks, in particular: small building complexes, local spatial development plans taking into account local conditions and connections, as well as forecasting the processes of transformation of the settlement structure of cities and villages;

A.W4. principles of universal design, including the idea of designing spaces and buildings accessible to all users, in particular for people with disabilities, in architecture, urban planning and spatial planning, and



ergonomic principles, including ergonomic parameters necessary to ensure full functionality of the designed space and facilities for everyone users, especially for people with disabilities.

#### Skills

A.U1. design an architectural object by creating and transforming space so as to give it new values - in accordance with a given program that takes into account the requirements and needs of all users;

A.U5. think and act creatively, using the workshop skills necessary to maintain and expand the ability to implement artistic concepts in architectural and urban design;

A.U6. integrate information obtained from various sources, interpret and critically analyze it;

A.U7. communicate using various techniques and tools in a professional environment appropriate for architectural and urban design;

A.U8. prepare architectural and construction documentation in appropriate scales in relation to the conceptual architectural design;

#### Social competences

A.S1. independent thinking to solve simple design problems;

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

##### LIGHTING DESIGN:

Assessment criteria and project evaluation method An important criterion for project evaluation will be the approach to the following issues:

1. Architectural, urban, historical and lighting analysis as the basis for the initial illumination concept.
2. Initial visual illumination concept of an architectural object.
3. Technical conditions proposed in the concept - modification of the initial assumptions.
4. Lighting calculations - modification of the concept and / or method of illumination.
5. The color of light and luminance as means of expression in illumination.
6. Testing the correctness of selected technical solutions (eg in terms of glare).
7. Examination and verification of lighting levels on the facades of the facility in particular phases of the project.

#### Formative assessment -

LIGHTING DESIGN: partial reviews checking the advancement of the student's work - individual consultations, brainstorming, joint discussion; review of the student's work progress 13 times during the semester (every class apart from occupational health and safety / introductory classes and final classes), from which obtaining 5 positive marks is a condition for passing the subject



Assessment scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0

Summative assessment -

LIGHTING DESIGN: final review after the last class - passing the design solutions presented at the forum of the group based on the substantive content of the study according to the scheme and the board in the standard A2 format. Descriptive and technical documentation of the project is delivered in a printed form in an A4 folder with an attached CD with a digital record of the project, documentation and a board.

Assessment scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0

Obtaining a positive grade for the module depends on the student achieving all the learning outcomes listed in the syllabus.

### Programme content

LIGHTING DESIGN:

Project: Development of the illumination concept for the selected architectural object, agreed with the tutor, meeting the formal criteria.

Analytical part:

- location of the object, its cubature, architectural style and detail, observation conditions (directions and distances), historical context as the basic analyzes necessary to create a design concept for the illumination of an architectural object,
- analysis of the current lighting condition of the facility,
- analysis of lighting equipment pre-selected for illumination,
- analysis of the possibility of installing selected lighting equipment in a given urban space.

Design part:

The design work is individual and includes the preparation of technical documentation of the illumination project of the selected architectural object, based on calculations, simulation and visualization of the object lighting in the DIALux environment. The design should include the following components: descriptive (analyzes, selection of the illumination method, characteristics of the illuminated detail) technical (hardware solutions, placement and targeting of lighting equipment).

### Teaching methods

1. Design.
2. Case study.
3. eLearning Moodle (a system supporting the teaching process and distance learning).



4. Working in groups.
5. Discussion.
6. Computer programs.

## Bibliography

Basic

LIGHTING DESIGN:

1. Bąk Jerzy, Pabjańczyk Wiesława, Podstawy techniki świetlnej, Nakład Politechniki Łódzkiej, Łódź 1994.
2. Hauser Jacek, Elektrotechnika. Podstawy elektrotermii i techniki świetlnej, Wydawnictwo Politechniki Poznańskiej 2006.
3. Mielicki Józef, Zarys wiadomości o barwie, Fundacja Rozwoju Polskiej Kolorystyki, Łódź 1997.
4. Technika Świetlna '96 Poradnik-Informator, Praca zbiorowa członków Polskiego Komitetu 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. E-skrypt dla przedmiotu „Projektowanie oświetlenia” (w opracowaniu).
8. PN-EN 12193:2002 (U) Oświetlenie stosowane w obiektach sportowych.
9. PN-EN 1838:2005 Zastosowanie oświetlenia. Oświetlenie awaryjne.
10. PN-EN 12665:2003 (U) Światło i oświetlenie. Podstawowe terminy oraz kryteria określania wymagań dotyczących oświetlenia.
11. PN-EN 13032-1:2005 (U) Światło i oświetlenie. Pomiar i prezentacja danych fotometrycznych lamp i opraw oświetleniowych. Część 1: Pomiar i format pliku.
12. 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.
13. PN-CEN/TR 13201-1:2005 (U) Oświetlenie dróg. Część 1: Wybór klas oświetlenia.
14. PN-EN 13201-2:2005 (U) Oświetlenie dróg. Część 2: Wymagania oświetleniowe.
15. PN-EN 13201-3:2005 (U) Oświetlenie dróg. Część 3: Obliczenia oświetleniowe.
16. PN-EN 13201-4:2005 (U) Oświetlenie dróg. Część 4: Metody pomiarów parametrów oświetlenia.



17. PN-EN 12464-1:2012 „Light and lighting - Lighting of work places - Part 1: Indoor work places”.
18. PN-EN 12464-2:2014 „ Light and lighting -- Lighting of work places -- Part 2: Outdoor work places”.
19. PN-IEC 60364 Instalacje elektryczne w obiektach budowlanych (norma wieloarkuszowa).
20. Ustawa Prawo Energetyczne z dnia 10 kwietnia 1997 r. (Dz. U. z 1997 r. Nr 54, poz. 348 z późniejszymi zmianami).
21. Zalecenia i wytyczne projektowe w zakresie luminancji i barwy w iluminacji (Design recommendations and guidelines for luminance and color in illumination).

#### Additional

#### LIGHTING DESIGN:

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.

#### Breakdown of average student's workload

	Hours	ECTS
Total workload	35	1,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>		

<sup>1</sup> delete or add other activities as appropriate