



COURSE DESCRIPTION CARD - SYLLABUS

Course name

LIGHTING AND ACOUSTIC DESIGN 2

		Course
Field of study		Year/Semester
ARCHITEKTURA		I/1
Area of study (specialization)		Profile of study
		general academic
Level of study		Course offered in
Second-cycle studies		english
Form of study		Requirements
full-time		compulsory

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

Number of credit points

2

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

Prerequisites
1 Knowledge: <ul style="list-style-type: none">the student has an orderly, theoretically founded general knowledge covering key issues in the field of lighting technology;the student has a basic knowledge of the role and importance of artificial light in architectural and urban design;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.
2 Skills:



- the student is able to creatively use the available Polish and English-language literature;
- the student has basic architectural and urban design skills;
- the student is able to obtain information from literature, databases and other, properly selected sources, also 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.

Social competence:

- is aware of the need to educate in fields related to architecture;
- can creatively cooperate in a group.

Course objective

LIGHTING DESIGN:

Project: Development of a lighting concept for a selected public utility building, agreed with the operator, meeting the formal criteria and normative requirements of PN-EN 12464-1 "Lighting technology - Lighting of workplaces - Part 1: Indoor workplaces" "Light and lighting - Lighting of work places - Part 1: Indoor work places "

Analytical part:

- characteristics of the object, function and visual workplaces, as the basic analyzes necessary to define the standardization guidelines for a given interior,
- analysis of lighting equipment in the analyzed lighting concept,
- analysis of the possibility of installing selected lighting equipment in a given interior.

Design part:

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

Course-related learning outcomes

Knowledge



B.W5. advanced issues of construction, construction technologies and installations, construction and building physics, covering key, complex issues in architectural, urban and planning design.

Skills

B.U4. formulate statements of the nature of a critical analysis in the field of architecture, as well as present and synthetically describe the ideological basis of the project based on the assumptions;

B.U5. use properly selected advanced computer simulations, analyzes and information technologies supporting architectural and urban design, as well as evaluate the obtained results and their usefulness in design, and draw constructive conclusions;

B.U6. prepare and present a presentation on the detailed results of a design engineering task using various communication techniques, including one formulated in a commonly understandable manner;

B.U7. prepare and present a presentation on the detailed results of a design engineering task using various communication techniques, including one formulated in a commonly understandable manner;

B.U8. properly apply professional and ethical standards and rules as well as legal provisions in the field of architectural and urban design and spatial planning.

Social competences

B.S1. formulating and transferring to the public information and opinions on the achievements of architecture and town planning, their complex conditions and other aspects of the architect's activity;

B.S2. reliable self-assessment, formulating constructive criticism regarding architectural and urban planning activities, as well as accepting criticism of the solutions presented by them, responding to criticism in a clear and substantive manner, also using arguments referring to the available achievements in the scientific discipline, and creative and constructive use of criticism.

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. Analysis of the interior of a public facility in terms of the initial lighting concept.
2. Initial concept of interior lighting of a public utility facility.
3. Technical conditions proposed in the concept - modification of the initial assumptions.
4. Lighting calculations - modification of the lighting concept and / or method, taking into account changes in lighting equipment.
5. Light color and illuminance as standardization measures in interior lighting.
6. Testing the correctness of selected technical solutions (eg in terms of energy efficiency).



7. Examination and verification of lighting levels on work planes in architectural interiors of a public facility.

Assessment forming LIGHTING DESIGN:

partial reviews checking the advancement of the student's work - individual consultations, brainstorming, joint discussion; review of the student's work progress 7 times during the semester (every course), from which obtaining 5 positive grades is a condition for passing the course.

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

Summary assessment LIGHTING DESIGN: final review after the last class - passing the design solutions presented in the forum of the group on the basis of the substantive content of the study according to the scheme and the board in the standardized A3 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

Programme content

LIGHTING DESIGN:

Development of a lighting concept for selected, agreed with the teacher, architectural interiors of the facility that meet the formal criteria.

Analytical part (individual):

- analysis of visual workplaces,
- analysis of functions in interiors,
- analysis of lighting equipment pre-selected for interior lighting design,
- analysis of the possibility of installing selected lighting equipment in a given interior in terms of ensuring the required parameters and reducing unfavorable lighting phenomena.

Design part:

The design work is individual and includes the preparation of technical documentation for the lighting design of selected, agreed with the tutor, architectural interiors of a public facility, based on calculations, simulations and visualization of lighting in the DIALux environment.

The design should include the following components:

- descriptive (analysis of functions and visual workplaces, analysis of lighting equipment);
- technical (equipment, achieved levels of illuminance and uniformity in relation to standards).



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. PN-EN 12193:2002 (U) Oświetlenie stosowane w obiektach sportowych.
8. E-skrypt dla przedmiotu „Projektowanie oświetlenia i instalacje elektryczne 2” (w opracowaniu).
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) ¹		

¹ delete or add other activities as appropriate