COURSE DESCRIPTION CARD - SYLLABUS

Course name
Building Physics - Lighting [S1Arch1E>FBO]

Course

Field of study
Architecture

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

Lecturers

Prerequisites

1 Knowledge • 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 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

The aim of the course is to provide knowledge in the field of: • perception and psychophysiology of vision, • lighting criteria, • issues of light-matter reaction, important from the point of view of architectural and urban lighting design, • basic concepts relating to technical, photometric and colorimetric aspects of lighting equipment, • basics of lighting equipment (luminaires and light sources) used in typical lighting systems and solutions, • rules for selecting equipment to perform the assumed lighting tasks, • illumination of architectural objects, • calculations, simulations and visualization of lighting for design purposes.

Course-related learning outcomes

Knowledge:
Student knows and understands:
B.W3. the importance of the natural environment in architectural and urban design and spatial planning;
B.W4. mathematics, space geometry, statics, material strength, shaping, construction and dimensioning of structures, to the extent necessary to formulate and solve tasks in the field of architectural and urban design;
B.W5. issues of construction, construction technologies and installations, construction and building physics, covering key issues in architectural, urban and planning design as well as issues related to fire protection of buildings;
B.W6. investment economics and organization methods as well as the course of the design and investment process; basic principles of design and implementation quality management in the construction process;
B.W9. principles of occupational health and safety.

Skills:
Student can:
B.U3. use properly selected computer simulations, analyzes and information technologies, supporting architectural and urban design;
B.U4. develop solutions for individual building systems and elements in terms of technology, construction and materials;
B.U5. make a preliminary economic analysis of planned engineering activities;
B.U6. properly apply standards and legal regulations in the field of architectural and urban design.

Social competences
Student is capable of:
B.S2. reliable self-assessment, formulating constructive criticism regarding architectural and urban planning activities.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing conditions and lecture evaluation method. The criterion for evaluating the subject will be knowledge of the presented aim of the subject.
Summative assessment:
Written test after the lectures - in the form of a multiple-choice test or essay questions. Completing an item for 50% points + 1.
Assessment scale: 2.0,3,0; 3.5; 4.0; 4.5; 5.0
Obtaining a positive grade from the module depends on the student achieving all the learning outcomes listed in the syllabus at the level of 50% + 1 points
Lecture:
Formative assessment:
periodic control of learning progress, active participation in classes
Accepted grading scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0.
Percentage of grades: 0–50% - 2.0 (insufficient); 50-60% - 3.0 (sufficient); 60-70% - 3.5 (sufficient plus); 70-80% - 4.0 (good); 80-90% - 4.5 (good plus); 90-100% - 5.0 (very good).
Summative assessment:
a final test or (if an exam is included in the curriculum) a written exam
Accepted grading scale: 2,0; 3,0; 3,5; 4,0; 4,5; 5,0.
Percentage of grades: 0–50% - 2.0 (insufficient); 50-60% - 3.0 (sufficient); 60-70% - 3.5 (sufficient plus); 70-80% - 4.0 (good); 80-90% - 4.5 (good plus); 90-100% - 5.0 (very good).

Programme content

1. perception and psychophysiology of view from the point of view of the application of artificial light;
2. lighting criteria and hierarchy of importance of lighting rules;
3. basic photometric quantities as a tool for formulating lighting guidelines and recommendations and for controlling light parameters;
4.reaction of light with matter as an important factor in the lighting design process;
5. technical aspects of lighting equipment;
6. bases of lighting equipment (luminaires and light sources) used in typical lighting systems and solutions;
7. rules for selecting equipment for the implementation of the assumed lighting tasks;
8. the theory of the illumination of architectural objects;
9. calculations, simulation and visualization of lighting for design purposes, basic tools for IT implementation of numerical and visualization lighting calculations.

Teaching methods

1. lecture;
2. lecture with multimedia presentation;
3. eLearning Moodle (a system supporting the teaching process and distance learning)

Bibliography

Basic
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
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	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50