COURSE DESCRIPTION CARD - SYLLABUS

Course name
Lighting and Acoustics Design_2

Course

Field of study
ARCHITECTURE

Year/Semester
I/1

Area of study (specialization)
-

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish/english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
30

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
PROJEKTOWANIE AKUSTYKI

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Prerequisites

1 Knowledge:

- basic knowledge of physics at high school level
- basic knowledge of architectural and urban design
- basic knowledge of the history of architecture

2. Skills:

• the student is able to obtain information from literature, databases and other, properly selected sources, can integrate information, interpret it, as well as draw conclusions and formulate and justify opinions

3. Social competences

• the student understands the need for lifelong learning,

• the student understands the need to expand competences,

Course objective

ACOUSTIC DESIGN:

- Acquiring the ability to design acoustic rooms for interiors with increased acoustic requirements

- Improving the skills of acoustic design of interiors with so called non-qualified acoustics in accordance with the requirements of the obligatory standard PN-B-02151-4 "Building acoustics - Protection against noise in buildings"

- Improving design skills in the CattAcoustic program - project of acoustics of a sports hall and a selected room made by the student during the studies

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 a critical analysis nature in the field of architecture, as well as present and synthetically describe the ideological basis of the project based on the assumptions made;

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 the 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 the 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. formulate and transfer information and opinions to the society on the achievements of architecture and town planning, their complex conditions and other aspects of the architect's activity;

B.S2. formulate reliable self-assessment, formulate constructive criticism regarding architectural and urban planning activities, as well as accept criticism of the solutions presented by them, responding to criticism in a clear and factual 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:

ACOUSTIC DESIGN:

The basis for the credit is the development of two project boards individually by each student

Formative assessment:

ACOUSTIC DESIGN:

- Assessment of involvement in design and calculation works

- Attendance

- Creativity in making design decisions in the field of architectural acoustics and correcting acoustic defects.

- Two design boards made individually by each student - assessment of the quality of the boards and design solutions

Assessment scale: 2,0; 3.0; 3.5; 4.0; 4.5; 5.0

Summative assessment -

The grade obtained for the test, the project boards, and attendance at classes.

The test checks the ability to calculate the reverberation time for a given room.

- Two 50 × 70 cm design boards, individually prepared by each student, developed in accordance with the guidelines. Each of the two projects should be presented on a separate board. Each of the boards should contain:

- description - the description should briefly characterize the function of the room and the design problem, provide guidelines from the PN-B-02151-4 standard "Building acoustics - Protection against noise in buildings" for the designed function and volume of the room, the reverberation time RT before and after the application of acoustic corrections, along with the material solutions.

- a modeled room from the Sketchup program, a scale showing the scale of the room, a cross-section and a view (plan) showing dimensions and scale or scale should be provided.

- comparative graph of the reverberation time RT in the frequency function, for the three considered cases.

- table - the value of the sound absorption coefficient α for octave bands should be given in the form of a table for all used finishing materials.

- view of the room with the sound source and the distribution of the STI parameter at the measurement points

Programme content

ACOUSTIC DESIGN:

1. Introduction to the subject. Standard PN-B-02151-4 "Building acoustics - Protection against noise in buildings"

2. Choosing a sports hall

3. Drawing the model in SketchUp and loading the model into CattAcoustic

4.5.6. Simulations in CATT-Acoustic

7. Preparation of the board

8. Selection of an interior prepared during the studies for the development of an acoustic design

9. Drawing a model of the room in SketchUp

10. Calculations of the reverberation time

11. Loading the model into the CattAcoustic program

12. 13. Simulations in CattAcoustic software

14. Preparation of the board

15. Delivery of projects

Teaching methods

1. Design

2. Case study

3. eLearning Moodle

4. Working in groups

5. Discussion

6. Computer programs

Bibliography

Basic

1. Egan D., Architectural acoustics, J. Ross Publishing, 2007

2. Ermann, M., Architectural Acoustics Illustrated. Wiley 2015

3. PN-B-02151-4 - Building Acoustics - Protection against Noise in Buildings (Polish standard)

Additional

1. Beranek L. Concert Halls and Opera Houses: Music, Acoustics and Architecture. Springer 2004, Second Edition Newhouse Victoria. Site and Sound, Monacelli Press 2012

2. Dalenbäck, B-I.L., CATT-Acoustic v9.1, User's Manual, CATT, Gothenburg, Sweden (2016).

3. Sygulska A., "The adaptation of the stage in opera house for concert" 58th Open Seminar on Acoustics, 13-16 September 2011, Gdańsk – Jurata, Tom II, s. 297-308.

4. Sygulska A., Spatial modifications of the stage of the opera house for the needs of a concert, 3(39) Architectus 2014, s. 75-83, doi:10.5277/ARCHITECTUS

5. Sygulska A., Brawata K., „The study of the proscenium area in an opera house", Archives of Acoustics, Vol. 42, No. 3, pp. 515-526, 2017

6. Sygulska A., The study of the influence of the ceiling structure on acoustics in contemporary churches, Archives of Acoustics, Vol. 44, No. 1, pp. 169-184, 2019

7. Sygulska A., Contemporary two-storey churches – acoustic investigations, Journal of Architecture and Urbanism, Volume 39, Issue 2, 2015, Taylor&Francis, str.140-148,

8. Sygulska A., Arts of opera singing, acoustics and architecture in opera house development, 7th Forum Acusticum 2014, Krakow 7-12.09. 2014.

Breakdown of average student's workload

	Hours	ECTS
Total workload	35	1
Classes requiring direct contact with the teacher	30	1
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