PHYSICS OF BUILDINGS 2

General information	
Subject	Physics of Buildings 2 - Thermomodernization of buildings
Faculty	Faculty of Civil Engineering, Architecture and Environmental Engineering
Course of study	Architecture
Profile	General academic
Type of study	I level with the degree of Eng. Arch.
Starting semester	Winter semester

Information about the subject	
Semester	5
Number of ECTS points	3
Subject type	obligatory
Language of instruction	English
Syllabus prepared by	Anna Staszczuk PhD Eng.

Type of class					
Course type	*Number of classes per semester (full time studies)*	*Number of classes per week (full time studies)*	*Number of classes per semester (part time studies)*	*Number of classes per week (part time studies)*	*Credit type*
Project	30	2	-	-	Credit with a grade

Subject objective
1. The objective in terms of skills is to teach the student to carry out thermal retrofitting projects in buildings in order to bring them up to the standard specified in the current requirements in terms of thermal protection. 2. The objective in terms of personal and social competences is to prepare the student to present their own solution to a project task in class and defend it in front of a group of students.

Initial requirements
Formal: Technical drawing, Materials science, General construction, Building construction, Building installations.

Subject scope
Project: preparation of a thermal retrofitting project for a building in order to bring it up to the building standard specified in the applicable requirements in terms of thermal protection.

Educational methods
Research methods: project – interactive and creative education.

Education results and verification methods			
Description	*Symbol*	*Verification method*	*Type of class*
The student can modernize buildings in order to bring them up to the standard specified in the applicable requirements in terms of thermal protection	K_U06	– observation and evaluation of the student's practical skills, – control work,	Project

		– preparing the project – partial reviews of the project	
The student is aware of the importance and need for lifelong education and improving their qualifications	K_K01	– one unjustified absence is acceptable, – points for participation and work in class	Project
The student knows that it is necessary be active, creative, determined, and open to the ideas of other people. The student can work individually and in a team.	K_K02	– one unjustified absence is acceptable, – points for participation and work in class	Project

Requirements to obtain a credit
Project: The student obtains positive grades for all partial tests, attends classes and is active in class. The rules of determining the grade: The grade for the subject includes the grades for the project exercises, the grade for attendance and the grade for participation. Scores: 50-60% - satisfavtory 61-70% - satisfactory plus 71-80% - good 81-90% - good plus 91-100% - very good. The final grade is the arithmetic mean of the grades based on the above scores.

Student's work	
Student's work	*Full time study (h)*
Interaction with the teacher (classes; consultations; exam, etc.)	50
Student's individual work (preparation for the classes, test exam; literature research preparation of: written paper, project, presentation, report, speech; etc.)	25
Total	75
ECTS points	*Full time study*
Work with a teacher	2
Work without a teacher	1
Total	3

Basic literature

1. Bąk J., Pabjańczyk W., Podstawy techniki świetlnej, Nakład Politechniki Łódzkiej, Łódź 1994.
2. Dean Heerwagen, *Passive and Active Environmental Controls. Informing the schematic designing of buildings*, The McGraw-Hill Companies, Inc. 2004.
3. Furmański P., Domański R., Wymiana ciepła, Przykłady obliczeń i zadania, Politechnika Warszawska, Warszawa 2002.
4. Hauser J., Elektrotechnika. Podstawy elektrotermii i techniki świetlnej, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.
5. Hugo Hens, *Building Physics - Heat, Air and Moisture: Fundamentals and Engineering Methods with Examples and Exercises*, 3rd Edition, Wiley, Ernst & Sohn, 2017.
6. Klemm P. (red.), Fizyka budowli, Tom 2, Arkady, Warszawa 2005.
7. Kubik J., Przepływy wilgoci w materiałach budowlanych, Polit. Opolska, Opole 2000.
8. Laskowski L., Ochrona cieplna i charakterystyka energetyczna budynku, Politechnika Warszawska, Warszawa 2008.
9. Pinteric Marko, *Building Physics. From Physical Principles to International Standards*, Springer International Publishing AG, 2017.
10. Pogorzelski J. A., Fizyka budowli dla architektów (cykl artykułów publikowanych od czerwca 2004 r. do października 2005 r.) w „Materiałach budowlanych".
11. Pogorzelski J. A., Katalog mostków cieplnych, ITB, Warszawa 2003.
12. Sadowski J., Akustyka architektoniczna, PWN, Warszawa 1976.
13. Steven V Szokolay, *Introduction to Architectural Science: The Basis of Sustainable Design*, Elsevier, Architectural Press, 2004.

14. Wyrwał J., Termodynamiczne podstawy fizyki budowli, Politechnika Opolska, Opole 2004.
15. Zakrzewski T., Żuchowski R., Kompendium akustyki architektonicznej wraz z przy-kładami metod obliczeniowych, Wydawnictwo Politechniki Śląskiej, Gliwice 2009.
16. Żagan W., Podstawy techniki świetlnej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005.
Aktualnie obowiązujące normy i rozporządzenia podane na zajęciach przez prowadzącego.

Complementary literature

1. Monthly „Izolacje".
2. Monthly „Materiały budowlane".

Notes