



### 1. Course number and name

RB-S1-19-S7C-E1, **Computer Simulations in Buildings Operation**

### 2. Credits and contact hours\*

2 ECTS, lectures: 30 hours\*\*

### 3. Instructor's or course coordinator's name

Janusz Belok PhD

### 4. Text book, title, author, and year

- Larry Brackney, Andrew Parker, Daniel Macumber, Kyle Benne Building Energy Modeling with OpenStudio: A Practical Guide for Students and Professionals, Springer 2018
- Gawin D. Komputerowa symulacja wymiany ciepła i masy w budynku. Przykłady zastosowań, Komputerowa Fizyka Budowli, Tom 1, Wyd. Politechniki Łódzkiej
- Gawin D., Kossecka E. Typowy rok meteorologiczny do symulacji procesów wymiany ciepła i masy w budynkach, Komputerowa Fizyka Budowli, Tom 2, Wyd. Politechniki Łódzkiej

### 5. Specific course information

#### a. brief description of the content of the course (catalog description)

##### Lectures:

Familiarize participants with the modern methods of testing the behavior of buildings under real operating conditions by computer simulation. Presentation of the basic principles of building a virtual model of a building, the presentation of the leading building simulation systems and their computing capabilities. Show a practical solution selected issues related to the operation of the object by means of the simulation of physical processes in buildings.

#### b. prerequisites or co-requisites

No prerequisites and additional requirements

#### c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

Required.



## **6. Specific goals for the course**

a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic

The student:

- knows the selected computer systems simulation of physical processes in buildings,
- knows the rules and regulations for the operation of buildings,
- can correctly select an analytical tool to solve some problems related to the operation of the object,
- can take advantage of information technology and Internet resources for research simulation of buildings.
- is aware of the responsibility for the reliability of the calculations and the correct interpretation of the results.
- be aware of the need to continuously improve the learned knowledge in a meet subject.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

K1A\_W02, K1A\_U08

## **7. Brief list of topics to be covered**

1. Introduction to the simulation of physical systems in buildings. Overview of the basic concepts related to this issue.
2. Presentation of commercial computer simulation systems.
3. Creating databases necessary for the conduct of simulation.
4. Defining a computational problem - the difference between a real object and the model, discuss how to transfer the principles of the operation of real building on a model platform.
5. Analysis of the results-selected examples.
6. Validation of simulation systems, examples of the results verification obtained from the simulation with in situ measured properties of the object.

\*- Consultations were not included in the contact hours

\*\* -per semester