1. Course number and name

RB-S1-19-W39-85, Buildings and Physics of Buildings II

2. Credits and contact hours*

4 ECTS, lectures: 30 hours**, classes: 5 hours**, project: 25 hours**

3. Instructor's or course coordinator's name

Jerzy Bochen, CEng, MSc, PhD, DSc, Assoc. Prof. , (part: Buildings)

Janusz Belok, CEng, MSc, PhD , (part: Physics of Buildings)

4. Text book, title, author, and year

- Emmitt S., Gorse C.: Barry's Introduction to Construction of Buildings. 4th edition, Oxford: Blakwell Publishing, 2007,
- Chudley R., Greeno R.: Building construction handbook. Incorporating current building & construction regulations. 6th edition Burlington: Elsevier Butterworth – Heinemann, 2006.

a. other supplemental materials

- Standards: ISO 6946 : 2017, ISO 13370 : 2017, ISO 13788 : 2012.
- Building regulations: Technical requirements on building elements, design and safety.
- Manufacture leaflets and cards about structural, finishing and insulating building products (e.g. precast floor beam, floor block, channel roof panel).

5. Specific course information

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

Lectures:

(1) Flat roofs: constr. types, ventilation, thermal dilatations, (2) Terraces: typical and reversed, types and design rules, (3) Balconies, design rules, (4) Industrial floors, construction and design principles, (5) Windows, basic properties and problems, (6) Glass facades in buildings, (7) Heat flow in materials and building components, thermal conductivity in the single and multi-layered construction, (8) Convection - heat exchange between the surface and the air, radiation heat transfer between the surfaces, (9) Thermal properties of building and insulation materials, thermal bridges, heat flow by a cavity wall, U-value calculations (ISO 6946), (10) Moisture analysis of buildings elements - surface condensation, the Glaser methods, analysis of interstitial condensation, fRsi factor calculation (ISO 13788), diffusion resistance.

Classes:

Discussing on elements of the Projects: Project part 1: Draw 1 – Precast beam and hollow block floor, Draw 2 – Foundation conception, Draw 3 – Flat space ventilated roof, Draw 4 – Details of terraces; Project part 2: Calculations on thermal insulation (ISO 6946) of selected elements: 1 - external cavity wall, 2 - basement floor, 3 - timber roof partition, 4 – flat roof, 5 - floor finish in the basement (ISO 13370).

Project:
Continued project of selected building elements of four-storey apartment building with regard to design principles, building regulations and standards. Preparing 4 drawings and 5 thermal calculations, according to the Classes guidelines.

b. prerequisites or co-requisites

Passing the subject: Buildings and Physics of Buildings in sem.3

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

Required, obligatory

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 can:

- make technical drawings such as: plans, cross sections and details,
- design selected basic building's structural elements with regard to appropriate insulations (beam and block floor, strip foundations, space ventilated roof, terrace),
- make a decision on choosing of building materials according to their function (thermal, water, vapour proof insulations),
- make calculations on thermal insulation of multilayer and heterogenous selected external partitions.

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

K1A_U01, K1A_W01, K1A_U05, K1A_U08

7. Brief list of topics to be covered

1. Review on basic elements of buildings as: flat roofs, terraces, balconies, industrial floor finishes, windows, window glasses, glass facades. Design quidelines.
2. Principles of making conception drawings of beam and block floor, strip foundation, flat ventilated roof and terraces.
3. Heat flow in building elements. Design principles of calculation on thermal insulation for multilayer and heterogenous partitions.
4. Convection - heat exchange between the surface and the air, radiation heat transfer between the surfaces.
5. Moisture transfer in building materials. Calculations on vapour interstitial and surface condensation, the Glasser method and fRsi coefficient.

*- Consultations were not included in the contact hours

**-per semester