COURSE DESCRIPTION CARD

The name of the course/module		Code
BUILDING PHYSICS - THERMICS		**A_P_1.4_008**
Main field of study	**Educational profile (general academic, practical)**	**Year/ term**
ARCHITECTURE	**general academic**	**II/4**
Specialization	Language of course:	Course (core, elective)
-	**Polish**	**core**
Hours: **30**		Number of points
Lectures: **X** Classes: Laboratory classes: Projects / seminars:		**1**

Level of qualification:	**Form of studies** (full-time studies/part-time studies)	**Educational area(s)**	**ECTS distribution (number and %)**	
I	**Full-time studies and part-time studies**	**Technical Sciences**	**1**	**100%**

Course status in the studies' program (basic, directional, other) (general academic, from a different major)

basic

Responsible for course/lecturer:

dr inż. Władysław Organista
Wydział Architektury
ul. Nieszawska 13C, 61-021 Poznań
tel. 61 665 32 60

Lecturer :

dr inż. Władysław Organista
Wydział Architektury
ul. Nieszawska 13C, 61-021 Poznań
tel. 61 665 32 60

Prerequisites defined in terms of knowledge, skills, social competences:

1	**Knowledge:**	▪ student has explicit, theoretically based knowledge including the key issues of building physics, ▪ student knows the basic methods, techniques and materials used at solving simple engineering tasks in the scope of building physics, ▪ student has knowledge of development trends in the scope of the energy saving and passive building engineering,
2	**Skills:**	▪ student can acquire information from field specific literature, data bases and other properly selected sources in Polish and English, can integrate the acquired information, interpret the said information, as well as draw conclusions and come up with opinions supported with satisfactory reasons, ▪ student can communicate using different techniques in the professional environment and in other environments, ▪ student can use IT techniques respectively to the performance of tasks typical for engineering activities,
3	**Social competences:**	▪ student understands the need for lifelong learning; can inspire and organize process of learning other people, ▪ student is aware of the importance of non-technical aspects and effects of engineering activities, in this impact upon the environment and liability for environment affecting decisions, ▪ student can work cooperate in a team, assuming a number of different roles therein.

Objective of the course:

- presentation of the latest knowledge in the scope of heating systems, ventilation and air conditioning in housing and industrial facilities,
- presentation of calculation method of heat load in buildings and other method of thermal-hydraulic calculations, hydraulic in designed installations,
- learning the principles of devices selection to calculation dimensions in designing heating systems, ventilation systems and air conditioning systems,
- get the ability to creativeness of assessment in designing the heating systems, ventilation systems and air conditioning systems,

Learning outcomes

Knowledge:

W01	has proper knowledge in the field of mathematics useful for the formulation of architectural and structural designing related tasks and useful for the solutions of such tasks	AU1_W08
W02	has basic knowledge of useful lives of structural facilities and their technical infrastructure systems	AU1_W22

Skills:

U01	can make calculations in the area of physics	AU1_U12
U02	can carry out initial economic analysis of the investment yield and assess the labour expenditure of the engineering works	AU1_U16
Social competences:		
K01	can work over a set task independently and can cooperate in a team, assuming a number of different roles therein; demonstrates responsibility in the work performance	AU1_K01
K02	can think and act in an entrepreneurial, creative and innovative manner	AU1_K07

The evaluation methods:

There is proposed written and oral exam as an evaluation method of the learning outcomes. Student can take the exam of course after obtaining positive grade for calculations, elaboration and defense of project of heating system of housing building, performing design classes of building installations.
Positive grade for module depends on achieved by student all learning outcomes specified in the syllabus.

Course contents

Under the educational program student takes part in lectures. During lectures student obtains required information to calculation method occurring during designing the heating, ventilation and air conditioning systems, information about selection method of type and size of devices needed in the system.
There are discussed requirements of thermal protection of buildings, thermal and moisture calculations of building partitions, and in accordance to European norm the calculation method of heat load (heat losses caused by transmission and ventilation) of premises and this is a basis for selection of heaters, control fittings to systems. There are presented principles of designing the heat distribution network to heating system, there are discussed the properties and types of materials used for building the network, heat source, requirements for boiler rooms using various types of fuels, types of surface heating and the new tendencies in designing buildings – energy-saving building engineering, passive building engineering and also solar systems and local heat sources in the form of fireplaces.

Basic bibliography

1. Koczyk H. , i inni. Ogrzewnictwo praktyczne, projektowanie, montaż, certyfikacja energetyczna, eksploatacja. Wydanie II , Wyd. Systherm Serwis Poznań 2009.
2. Krygier K. , i inni. Ogrzewnictwo. Wentylacja. Klimatyzacja. Wyd. WSiP. Warszawa 1997.
3. Gaziński B. Technika Klimatyzacyjna dla praktyków, komfort cieplny, zasady obliczeń i urządzenia. Wyd. Systherm Serwis Poznań 2005.
4. Mùrmann H. Wentylacja mieszkań. Wentylacja regulowana z odzyskiem ciepła. Wyd. Instalator Polski Warszawa 2001.
5. PN – EN ISO 6946 Komponenty budowlane i elementy budynku. Opór cieplny i współczynnik przenikania ciepła. Metoda obliczania.
6. PN – EN 12831 Instalacje grzewcze w budynkach. Metody obliczania projektowego obciążenia cieplnego.
7. PN – EN ISO 13790 Cieplne właściwości użytkowe budynków. Obliczenie energii cieplnej do ogrzewania.

Supplementary bibliography

1. Nantka M. Ogrzewnictwo i ciepłownictwo. Tom I i II. Wydawnictwo Politechniki Śląskiej Gliwice 2006.
2. Recknagel, Sprenger i inni. Ogrzewanie i klimatyzacja.Poradnik. Wyd. EWFE Gdańsk 2008.
3. Gutkowski K. Chłodnictwo i klimatyzacja. Wyd. N–T Warszawa 2003.

The student workload

Form of activity	Hours	ECTS
Overall expenditure	37	1
Classes requiring an individual contact with teacher	32	1
Practical classes	-	-

Balance the workload of the average student

Form of activity	Number of hours
participation in lectures	30 h
participation in classes/ laboratory classes (projects)	0 h
preparation for classes/ laboratory classes	0 h
preparation to colloquium/review	0 h

participation in consultation related to realization of learning process	0 h
preparation to the exam	5 h
attendance at exam	2 h

Overall expenditure of student: **1 ECTS credit** **37 h**

As part of this specified student workload

- activities that require direct participation of teachers:

  30 h + 7 h = 37 **h** **1 ECTS credit**