THE CARD OF DESCRIPTION THE EDUCATION MODULE

Name of course/module			Code
BUILDING INSTALLATIONS-HEATING AND VENTILATION SYSTEMS			**AU_P_1.4_009**
Main field of study **ARCHITECTURE AND URBAN PLANNING**	Education profile (general academic, practical) **general academic**		Year/ Semester **II/4**
Specialization **-**	Language of course: **Polish**		Course (core, elective) **core**
Hours: **15** Lectures: Classes: Laboratory classes: Projects / seminars: **x**			Number of points **1**

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

Course status in the study program (basic, directional, other) (general academic, from other field of study)

directional

xx

xxx

Odpowiedzialny za przedmiot / wykładowca:

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Prerequisites 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 over a set task independently and can cooperate in a team, assuming a number of different roles therein.

Objective of the course:

- acquisition of the newest knowledge in the scope of heating systems, ventilation and air conditioning in housing and industrial facilities,

- mastering the skills of design,
- learning the calculation method of thermal power demand of premises and buildings and thermal-hydraulic and hydraulic calculations related to ventilation and air conditioning.

Learning outcomes

Knowledge:	
1	student knows basic techniques, calculation methods of projected heat demand for heating the premises and buildings
2	student knows calculations method of internal installation, selection of heaters, devices in the heating, ventilation and air conditioning systems
3	student has knowledge of development trends in building engineering and understands the general principles of energy-efficient designing of buildings
Skills:	
1	student can propose modern (based on new trends) solutions of sanitary installations of building and can select the sanitary equipment
2	student can carry out critical analysis of the manner of operation and assess the existing solutions of heating, ventilation and air conditioning systems
Social competences:	
1	student has ability to creation of something new (original)
2	student correctly identifies and solves the problems related to energy-efficient building engineering

Methods of check the learning outcomes:

During classes student gets plan of building facility and student has to design heating system for that facility. The teacher determines additional technical data for each plan of building: climate zone, type of heating system, type of used material for heat piping, type of heaters, type of fuels for heating the boilers.
The basis of classes credit is checking the correctness of performance of heating system project with all technical elements and its defense.

Course contents

Under the education program student:

- mastering the skills of design the heating system and others (ventilation, air conditioning systems),
- learning the used heating, ventilation, air conditioning systems according to schemas,
- learning the calculation method used in heating, ventilation, air conditioning systems,
- learning the new trends in designing the energy-saving and passive buildings.

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.

Complementary 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 workload of student

Form of activity	Hours	ECTS
Total workload	30	1
Activities that require individual contact with the teacher	22,5	1
Activities of practical	15	-

Balance the workload of the average student

Form of activity	Number of hours
participation in lectures	0 h
participation in classes/ laboratory classes (projects)	15 h
preparation for classes/ laboratory classes	15 x 0,5 h = 7,5 h
preparation to colloquium/review	0 h
participation in consultation related to realization of learning process	15 x 0,5 h = 7,5 h
preparation to the exam	0 h
attendance at exam	0 h

Total workload of student: 1 **ECTS credit** **30 h**

As part of this specified student workload

- activities that require direct participation of teachers:

15 h + 7,5 h = 22,5 **h** 1 **ECTS credit**