STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
District Heating and Gas Distribution		**1010101251010130285**
Field of study	Profile of study (general academic, practical)	Year /Semester
Environmental Engineering First-cycle Studies	**general academic**	**3 / 5**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **15** Classes: **-** Laboratory: **-** Project/seminars: **15**		**2**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
major	**from field**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Fundamentals of combustion processes. Incompressible fluid flows in pipes, pressure loss, pump selection. Pressure, pressure units. Fundamentals of heat exchange. Basics of materials science. Control systems.
2	**Skills**	Calculation of simple and complex hydraulic networks. Calculation of heat transfer through flat and curved walls. Selection of control equipment for hydraulic networks.
3	**Social competencies**	Ability to work in team. Awareness of the need to continually update and supplement one's knowledge and skills.

Assumptions and objectives of the course:

To teach students basic information about municipal and industrial heat distribution systems, including: heat source, pipe line system, heat transfer unit.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows pronciples of operation of municipal and industrial heat distribution systems, based on conventional heat sources - [[K_W04, K_W05]]
2. Student has the knowledge about construction, design and operation of: medium size boiler house (water and steam) and relevant pipe lines and heat transfer units - [[K_W05,K_W06,K_W07]]
3. Student has the knowledge about design and operation of district heating systems including: heat source, pipe lines, heat transfer units - [[K_W05,K_W06,K_W07]]
4. Student has a basic knowledge about cogeneration systems - [[K_W04, K_W06]]

Skills:

1. Student can to calculate heat demand for medium size residential systems - [[K_U13, K_U14]]
2. Student knows how to design medium size boiler house including control and safety systems - [[K_U01, K_U04, K_U07, K_U13, K_U14]]
3. Student knows how to design and analyze heat distribution system, including: heat source, pipe lines, district heating substation, basic control equipment - [[K_U01,K_U03, K_U07,K_U13, K_U14]]

Social competencies:

1. Student is aware of the purpose of municipal heat distribution systems - [[K_K02, K_K]]
2. Student understands the significance of team work in resolving theoretical and practical problems - [[K_K03]]

Assessment methods of study outcomes

Lecture: written test
Seminars (design classes): evaluation of work progress during contact hours, presentation of finished design.

Course description

Municipal heating systems - purpose, structure, other considerations.
Heating demand calculations.
Boiler house - structure and relevant calculations.
Distribution system - structure and relevant calculations.
Heat transfer units - structure and relevant calculations.
Automatic control in municipal heating systems.
New trends and technologies in municipal heating systems.

Basic bibliography:

1. Szargut J. , Ziębik A., Podstawy energetyki cieplnej, PWN, Warszawa, 2000
2. Szkarłowski A., Łatowski L.: Ciepłownictwo, WNT 2006
3. Krygier K., Sieci ciepłownicze, Oficyna Wydawnicza PW, Warszawa 2006
4. Mizielińska K., Olszak J., Gazowe i olejowe źródła ciepła małej mocy, Oficyna Wyd. PW, Warszawa 2006
5. Nantka M., Ogrzewnictwo i ciepłownictwo; t.1 i 2; Wydawnictwo Politechniki Śląskiej, Gliwice 2010
6. Foit H., Indywidualne węzły cieplne, Wyd. Politechniki Śląskiej, Gliwice 2010

Additional bibliography:

1. Ciepłownictwo, eksploatacja, projektowanie, inwestycje; praca zbiorowa; (zeszyty tematyczne); Unia Ciepłownicza 1995
2. Turschmidt R.: Kotłownie i elektrociepłownie przemysłowe, Arkady, 1988
3. Krygier K., Sieci cieplne, materiały do ćwiczeń projektowych, Oficyna Wyd. PW, Warszawa 1993

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in seminars (design exercises)	15
3. Additional consultations with teacher	5
4. Preparation of individual design for seminars (work at home)	10
5. Preparation for final tests	5

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	35	1
Practical activities	15	1