

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject District Heating and Gas Distribution		Code 1010101241010130285
Field of study Environmental Engineering First-cycle Studies	Profile of study (general academic, practical) general academic	Year /Semester 2 / 4
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: - Project/seminars: 15		No. of credits 3
Status of the course in the study program (Basic, major, other) major		(university-wide, from another field) from field
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer: dr inż. Fabian Cybichowski email: fabian.cybichowski@put.poznan.pl tel. 61 665 24 38 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		Responsible for subject / lecturer: dr inż. Łukasz Amanowicz email: lukasz.amanowicz@put.poznan.pl tel. 61 665 24 38 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Fundamentals of combustion processes. Gas flows in pipes, pressure loss, pressure reduction. Pressure, pressure units. Basics of materials science.
2	Skills	Calculation of gas flow in pipes, knowledge about impact of pressure and temperature on gas properties.
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 construction, operation and design of low and medium pressure natural gas distribution systems.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows how to calculate gas demands in municipal natural gas systems - [[K_W04, K_W05]] 2. Student has the knowledge about construction, design, operation and control of low and medium pressure natural gas distribution systems - [[K_W05, K_W06, K_W07]]		
Skills:		
1. Student can calculate gas demand for medium size residential gas system - [[K_U13, K_U14]] 2. Student knows how to design gas system in medium size residential area - [[K_U01, K_U03, K_U07, K_U13, K_U14]] 3. Student knows how to design gas connection and internal gas system for a residential building - [[K_U04, K_U07, K_U13, K_U14]]		
Social competencies:		
1. Student is aware of the purpose of municipal gas 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		

<p>Basic concepts, types of gas. Gas demands fluctuations. Calculations of gas systems. Materials and technologies used in gas systems. Principles of designing and building municipal gas systems. Gas systems in buildings. Hazards associated with natural gas systems.</p>		
<p>Basic bibliography: 1. Bąkowski K.: Sieci gazowe, WNT, Warszawa, 1999 2. Łaciak M., Bezpieczeństwo eksploatacji urządzeń instalacji sieci gazowych, Rarbonus, 2010</p>		
<p>Additional bibliography:</p>		
<p>Result of average student's workload</p>		
<p>Activity</p>	<p>Time (working hours)</p>	
1. Participation in lectures	15	
2. Participation in seminars (design classes)	15	
3. Additional consultations	5	
4. Preparation of individual design for seminars (work at home)	10	
5. Preparation for final tests	5	
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
Total workload	50	3
Contact hours	35	2
Practical activities	15	1