

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Safety of exploitation of gas fired units		Code 1010632231010638155
Field of study Mechanika i budowa maszyn	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Gas technology and renewable energy	Subject offered in: English	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: dr inż. Rafał Ślefarski email: rafa.slefarski@put.poznan.pl tel. 616652218 Faculty of Machines and Transport ul. Piotrowo 3 60-965 Poznań		Responsible for subject / lecturer: Prof. dr hab inż. Andrzej Teodorczyk email: atead@itc.pw.edu.pl tel. tel. 22 234 5226 Warsaw University of Technology ul. Nowowiejskiego 21/25, 00-665 Warszawa
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge in the field of mathematics, physics, thermodynamics and fluid mechanics and knowledge about exploitation processes of energetic machines.
2	Skills	Student should have skills required to solve engineering problems with scientifically valid methodologies. Can effectively acquire the information from various sources including datasheets, literature and Internet.
3	Social competencies	Student knows restrictions of the own knowledge and the skill; understands the need for lifelong education
Assumptions and objectives of the course: To acquaint students with the theoretical and practical problems related to the safety exploitation of gas fired power plants and heating systems		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. . Has comprehensive knowledge about thermodynamics and combustion process of gas fuels, necessary for solving engineering and scientific problems ? [K2A_W04] - [-]		
2. Has an extended knowledge in the area of on the safety of exploitation process of gas fired units ? [K2A_W05] - [-]		
3. He has in-depth knowledge of the basics of combustion of gaseous and liquid fuels ? [K2A_W14] - [-]		
Skills:		
1. Is able to obtain information from the literature, internet, databases and other sources. Can integrate the information to interpret and learn from them, create and justify opinions. - [K1A_U02] - [-]		
2. Is able to use a common numerical computations system for calculation of exploitation parameters for typical gas fired units - [K2A_U03] - [-]		
3. .Is able to evaluate the potential threat during exploitation of gas fired units and power plant. - [K2A_U05] - [-]		
Social competencies:		
1. Understands the need for lifelong learning; is able to inspire and organize the learning process of others. [K2A_K01] - [-]		
2. . Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions. - [K2A_K02] - [-]		
3. Is able to evaluate the potential threat during exploitation of gas fired units and power plant. - [K2A_U05] - [-]		

Assessment methods of study outcomes		
Lecture ? the written examination The evaluation of student knowledge will be held based on an answers on 5 questions from the material presented during the lectures. Classes - - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject,		
Course description		
Combustion of gases and vapors, explosions and detonations of premixed gas/vapor and air, ignition of premixed gas/vapor and air, flash point of liquids, initiation and attenuation of detonation, diffusion and premixed flames, laminar and turbulent combustion, flammability, maximum pressure of combustion, parameters of explosion , detonations, shock waves, energy of ignition, transition from explosion to detonations, zone of safety area in industrial facilities		
Basic bibliography:		
1. J.Jarosinski & B.Veyssiere: Combustion Phenomena, CRC Press Taylor & Francis Group 2009 2.j 3. 2. T.Rychter. A. Teodorczyk: Obliczenia wybuchów gazowych w przestrzeniach zamkniętych i wentylowanych, PWN 2002 3. Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki Poznańskie		
Additional bibliography:		
1. Jaroński J.: Techniki czystego spalania. WN-T W-wa 1996 2. Thierry Poinsot: Theoretical and numerical combustion 3. Andrzej Kowalkiewicz: Podstawy procesów spalania		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the lecture	5	
2. Participation in the lecture	15	
3. Fixing the lecture	15	
4. Consultation for the lecture	2	
5. Preparing to pass the lectur	10	
6. Participation in the completion of the lectur	2	
7. Preparation of practical classes	5	
8. Participation in the classe	15	
9. Consultation for the classes	5	
10. Preparing to pass the classes	5	
11. Participation in the completion of the classe	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	81	2
Contact hours	41	0
Practical activities	0	0