

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Fuels and energy conversion		Code 1010311441010315643
Field of study Power Engineering	Profile of study (general academic, practical) (brak)	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: 30 Classes: - Laboratory: 15 Project/seminars: -		No. of credits 3
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 %) 3 100% 3 100%
Responsible for subject / lecturer: dr inż. Robert Wróblewski email: robert.wróblewski@put.poznan.pl tel. 61 665 2523 Electrical Engineering ul. Piotrowo 3A, 60-965 Poznan		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of physics, chemistry, economic geography
2	Skills	Skill of effective self-education in an area related to the chosen field of studies
3	Social competencies	Is aware of the need to expand their competence, their willingness to cooperate within the team
Assumptions and objectives of the course: Getting to know characteristics of energy fuels and how they are used for energy purposes. (a processing method one form of energy into other)		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a knowledge of the characteristics of the fuel gas, liquid and solid, and their resources and production in Poland and in the world. - [K_W07 +; K_W09 ++; K_W022 ++]		
2. Has ordered and the supporting theory knowledge of the characteristics of combustion and stoichiometric calculations and the process of gasification and conversion of one fuel to another. - [K_W03 +++; K_W09 ++; K_W08 ++]		
3. Has ordered and based on the theory of knowledge of the characteristics of combustion and stoichiometric calculations and the process of gasification and conversion of one fuel to another. - [K_W06 ++]		
Skills:		
1. As a result of the course the student will be able to apply technological system suitable for burning different types of fuels, taking into account the limitation of emissions of harmful substances. - [K_U01 +; K_U02 ++]		
2. Perform stoichiometric calculations for gaseous, liquid and solid fuels, and determine calorific value. - [K_U01 +; K_U04 ++; K_U09 ++]		
Social competencies:		
1. Is aware of impact on the environment exerts the use of fossil fuels. - [K_K02 ++; K_K04 ++]		
Assessment methods of study outcomes		

<p>lecture</p> <ul style="list-style-type: none"> - Assess the knowledge and skills shown on the written examination of a problematic, - Continuous assessment for each course (rewarding the activity and quality of perceptions). <p>Laboratory:</p> <ul style="list-style-type: none"> - Test and rewarding knowledge necessary for the accomplishment of the problems in the area of laboratory tasks. - Assess the knowledge and skills related to the implementation of the tasks of exercises, evaluation reports performed exercise. <p>Get extra points for activity in the classroom, and in particular for:</p> <ul style="list-style-type: none"> - Proposing to discuss additional aspects of the subject; - The effectiveness of applying knowledge when solving a given problem; - Ability to work within a team practically performing the task detailed in the laboratory; - Comments relating to the improvement of teaching materials; - Aesthetic diligence reports and jobs - in the framework of self-study. 		
Course description		
<p>Fuels: gas, solid and liquid - resources and characteristics. Biofuels. Municipal and industrial waste, as a source of heat. Kinetics of elementary reactions. The basic equation describing the combustion process. Clean combustion of fuels. Increase the efficiency of of combustion - regeneration and heat recovery./</p> <p>High efficiency combustion technologies. Combustion with oxygen. Security combustion explosion, detonation.</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. 1. Spalanie i Paliwa, W. Kortylewski, Oficyna Wydawnicza Politechniki Wrocławskiej 2001 2. 4. Paliwa formowalne biopaliwa i paliwa z odpadów w procesach termicznych, J. W. Wandrasz, A. J. Wandrasz, wydawnictwo ?Seidel-Przywecki? Sp. z o. o., Warszawa 2006. 3. 2. Biopaliwa, P. Gradziuk Wydawnictwo ?Wieś Jutra? Sp. z o. o., Warszawa 2003. 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. 6. Kotły. Konstrukcje i obliczanie, S. Kruczek, Oficyna Wydawnicza Politechniki Wrocławskiej,2001 2. 7. Procesy zgazowania. Inżynierskie metody obliczeń. J. Kozaczka, Wydawnictwa AGH, Kraków 1994 3. 5. Technologie energetyczne, T. J. Chmielniak, Wydawnictwo politechniki Śląskiej, Gliwice 2004. 4. 3. Kotły fluidalne ? teoria i praktyka, Z. Bis, Częstochowa 2010 		
Result of average student's workload		
Activity	Time (working hours)	
1. Lecture	30	
2. Laboratories	15	
3. Preparing to laboratory classes	10	
4. Reports	5	
5. participation in consultations	10	
6. Preparation for the exam	20	
7. Exam	3	
Student's workload		
Source of workload	hours	ECTS
Total workload	83	3
Contact hours	58	2
Practical activities	30	1