

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Technology of Gaseous Fuels Utilization		Code 1010632231010630544
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Thermal Engineering	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - 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 Rafal Ślefarski email: rafal.slefarski@put.poznan.pl tel. 61-6652135 Maszyn Roboczych i Transportu Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of technical thermodynamics, fluid mechanics and construction of energetic devices
2	Skills	The Student can prepare thermodynamic and fluid mechanic calculation and know how to analyze the complex technological systems in heat production
3	Social competencies	The Student is able to work in a group, taking in her different roles in order to solve the posed in front of him.
Assumptions and objectives of the course: To acquaint students with the basic theoretical and practical aspects related to the technology of utilization of gaseous fuels in industry.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has an extended knowledge of thermodynamics and fluid mechanics to the extent necessary for an understanding of the principles and calculations of thermodynamic processes and flow occurring in the energetic machines:- - [K2A_W04] 2. Knows modern methods of engineering graphics and theoretical basis for calculation using finite elements method - [K2A_W06]		
Skills:		
1. Is able to assess potential negative impacts for the natural environment and humans, originating from the designed machine or a vehicle from the selected equipment group - [K2A_U14] 2. Is able to use the acquired knowledge of thermodynamics and fluid mechanics for the simulation of thermodynamic processes in technological equipment, using special computer programs - [K2A_U04] 3. Is able to perform basic measurements of mechanical properties on a selected machine using modern measurement systems. - [K2A_U08]		
Social competencies:		
1. Is aware of and understands the non-technical aspects and effects for mechanical engineer and its impact on the environment and responsibility for - [K2A_K02] 2. Understands the need for lifelong learning; is able to inspire and organize the learning process of others - [K2A_K04] 3. Is able to think and act in an entrepreneurial manner - [K2A_K05]		

Assessment methods of study outcomes		
Lecture ? the written examination		
Course description		
Resources of natural gases, exploration of natural gases, transport and storage of gaseous fuels, production process of high hydrocarbons gases, thermodynamic properties of flammable gases, equations of real gases, Joule-Thompson phenomena, low heating value, high heating value, adiabatic flame temperature, laminar flames, turbulent flames, detonation, deflagration, devices powered by gaseous fuels: boilers, industrial furnaces, heaters, combustion process of gaseous fuels in energetic boilers, gas turbines, gas engines, technology of industrial utilization of hydrogen, natural gas in chemical industry, fuel cells,		
Basic bibliography:		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparing for a lecture	5	
2. Participation in the lecture	30	
3. Fixation of the lecture	10	
4. Consultation	2	
5. Preparation to the exam	15	
6. Participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	64	2
Contact hours	10	1
Practical activities	10	1