STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Technology of Gaseous Fuels Utilization		**1010635231010630544**
Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**general academic**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Thermal Engineering and Renewable Energy	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
Second-cycle studies	**part-time**	
No. of hours		No. of credits
Lecture: **18** Classes: **-** Laboratory: **-** Project/seminars: **-**		**2**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
other	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**2 100%**

Responsible for subject / lecturer:

dr inż. Rafał Ślefarski
email: rafal.slefarski@put.poznan.pl
tel. 616652218
Faculty of Transport Engineering
ul. Piotrowo 3 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in the field of thermodynamics and fluid mechanics and knowledge about phenomena existing in energetic machines such as gas turbine, gas engines.
2	**Skills**	The ability to analyze simple energy systems in terms of energy production (combustion processes), heat energy transport, flow phenomena and impact on the natural environment.
3	**Social competencies**	Awareness of the necessity to broaden the scope of acquired knowledge and skills. Ability to comply with the rules applicable during lecture and laboratory classes, ability to communicate with the closest environment during lectures and exercises and to perform work in a laboratory team (

Assumptions and objectives of the course:

To acquaint students with modern, low-emission and high efficiency technologies connected to use of gaseous fuels in heat and electricity production as well as production of non-standard gaseous fuels.

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

Knowledge:

1. Student Has extended knowledge from thermodynamics, fluid mechanics necessary for solving thermodynamic and fluid mechanics problems in energetic machines during combustion process, heat exchange process. - [M2_W04]
2. Has extended knowledge in selected fields in mechanical engineering thermal processes, combustion processes and heat transfer - [M2_W14]
3. Has knowledge about methods used during investigation of working machines with introduction of modern measurement and archiving techniques. - [M2_W18]

Skills:

1. Is able to use knowledge from thermodynamics and fluid mechanics fields for symulation process of work of energetic machines and devices using modern numerical codes. - [M2_U13]
2. Is able to interact with other people as part of team work and take a leading role in teams - [M2_U22]

Social competencies:

1. Student is ready to fulfill social obligations, inspire and organize activities for the social environment - [M2_K03]
2. He is ready to think and act in an entrepreneurial way - [M2_K05]

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.

Course description

Methods and apparatus for syngas, biogas and pyrolysis gas production, advanced gas turbine cycles, new ignition systems for gas engines, low emission combustion processes of gaseous fuels in furnace and boilers, thermal neutralization of VOCs, reduction systems for toxic compounds, energy storage processes, power to X

Basic bibliography:

1. Dobski, T.: Combustion Gases in Modern Technologies, 2scd Ed., Wydawnictwo Politechniki Poznańskiej, 3. 4. Vademecum Gazownika, praca zbiorowa
2. Molenda J.: Gaz ziemny. Paliwo i surowiec, WNT, Warszawa
3. P. Basu: Biomass Gasification and Pyrolysis: Practical Design and Theory
4. Vademecum Gazownika, praca zbiorowa

Additional bibliography:

1. P. Jansohn. Modern Gas Turbine Systems

Result of average student's workload

Activity	Time (working hours)
1. Participation in the lecture . .	30
2. Fixing the lecture	15
3. Participation in consulatation of materials	5
4. Preparing to pass the lecture	15
5. Participation in the completion of the lecture	2

Student’s workload

Source of workload	hours	ECTS
Total workload	67	2
Contact hours	37	1
Practical activities	30	1