STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Biomass and gasification process		**1010632231010636692**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanika i budowa maszyn	**(brak)**	**2 / 3**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Gas technology and renewable energy	**English**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **1** Classes: **1** Laboratory: **-** Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowladge In the field of chemistry, physics and thermodynamics
2	**Skills**	Can use the scientific method for problem solving, experimenting, and making conclusions.
3	**Social competencies**	Knows the limitations of his or her own knowledge and skills.

Assumptions and objectives of the course:

To acquaint students with the theoretical and practical problems related to the biomass and waste gasification process

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

Knowledge:

1. He has in-depth knowledge of the design and operation of gasification installations ? [K2A_W18 - [-]
2. Has comprehensive knowledge about production of synthesis gases [K2A_W11] - [-]
3. Has comprehensive knowledge about physics, thermodynamics, and the burning of gas fuels, necessary for solving engineering and scientific problems within his or her area of study ? [K2A_W04] - [-]

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_U03] - [-]
2. Is able to freely use an international language in contacts with professionals from the same field of study.- [K2A_U01] - [-]
3. He can correctly select the optimal material and processing technology for the gasification process of biomass or waste - [K2A_U05] - [-]

Social competencies:

1. 1. 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] - [-]
2. 2. Is able to think and act in an entrepreneurial manner. ? [K2A_K05] - [-]
3. 3. Is aware of social role of mechanical engineer, understands the need for and is able to deliver opinions and knowledge in the field of machine design, particularly through the media. ? [K2A_K06] - [-]

Assessment methods of study outcomes
Lecture ? the written examination Classes - final test and rewarding knowledge necessary for the accomplishment of the problems in the area of the subject
Course description
The basic theory of gasification process, combustion of syngas in internal gas engines, new technology of gasification process, combustion of synthesis fuels, prospects for the development of gasification in Europe and Poland, chemical reactions in gasification process, methane number, knocking, compression ratio, construction of installation for gasification process, flame stability, flash back, emission of formaldehyde, cost-effectiveness of installing
Basic bibliography: 1. Gasification, Second edition. Christopher Higman, Maarten van der Burgt 2. Biomass Gasification, Pyrolysis and Torrefaction. Prabir Basu
Additional bibliography: 1. Synthesis gas combustion. Fundamentals and applications. Tim Lieuwen, Vigor Yang, Richard Yetter

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 lecture	10
6. Participation in the completion of the lecture	2
7. Preparation of practical classes	5
8. Participation in the classes	15
9. Consultation for the classes	5
10. Preparing to pass the classes	5
11. Participation in the completion of the classes	2

Student's workload

Source of workload	hours	ECTS
Total workload	81	2
Contact hours	41	2
Practical activities	0	0