STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Physicochemistry of gases		**1010601211010618480**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

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

No. of hours				No. of credits
Lecture: **2**	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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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The student knows the basics of physics and chemistry and the basics of thermodynamics and fluid mechanics
2	**Skills**	The student speaks terminology in mechanics, thermodynamics, physics and chemistry. Corrects description of observed phenomena, analysis of received results and drawing conclusions
3	**Social competencies**	The student works in an interdisciplinary team. Ability to lead the team and expand team knowledge

Assumptions and objectives of the course:

Demonstration of dependencies describing physical and chemical properties of gases.

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

Knowledge:

1. has a basic knowledge in the field of chemistry, knows the properties of chemical elements, types of chemical reactions in understanding lectures on metal and non-metal materials, environmental protection, fuels and lubricants, building materials and soil, biomechanics and biological materials processed by agricultural and food machines - [M1A_W02]

2. has knowledge of physics, including static physics: internal and external friction, thermal and electrical conductivity, diffusion. - [M1A_W03]

3. Has basic knowledge in the field of technical thermodynamics, i.e. the theory of thermodynamic transformations, heat transfer, thermal machines and heating, drying and cooling devices. - [M1A_W08]

Skills:

1. is able to obtain information from literature, the Internet, databases and other sources, in Polish and foreign languages, can integrate the information obtained, interpret it and draw conclusions from it - [M1A_U01]

2. has the ability to self-education using modern teaching tools, such as remote lectures, internet sites and databases, teaching programs - [M1A_U27]

Social competencies:

1. understands the need and knows the possibilities of continuous training, knows the need to acquire new knowledge for professional development - [M1A_K01]

2. can think and act in an entrepreneurial wa - [-]

Assessment methods of study outcomes
-test

Course description
Thermodynamic properties: equations of state of perfect, semi-perfect and real gases, compressibility factor, standard equations of natural gases. Viscosity of gases and liquids, depending on pressure and temperature. The impact of gases on pipeline materials, thermodynamic and chemical potential. Impact of aggressive components, anti-corrosion and anti-erosive protection. Combustion.

Basic bibliography:

1. H. Buchowski, W. Ufnalski "Fizykochemia gazów i cieczy", Wydawnictwa Naukowo -Techniczne, Warszawa 2012
2. J. Szargut: Termodynamika techniczna, PWN 1991
3. J. Molenda: Gaz ziemny, PWN 1999

Additional bibliography:

1. . K. Pigoń, Z. Ruziewicz: Chemia fizyczna, PWN 2012

Result of average student's workload

Activity	**Time (working hours)**
1. Participation in the lecture	30
2. Consultations	1
3. Preparation for test	6
4. Participation in the test	1
5. Preparation in exercise	1
6. Participation in exercises	15
7. Consultations	1
8. Consolidations of the exercises message	3
9. Participation in the test	1

Student's workload

Source of workload	**hours**	**ECTS**
Total workload	59	2
Contact hours	49	2
Practical activities	0	0