

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Energy management</b>		Code <b>1010614161010610234</b>
Field of study <b>Mechanical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 6</b>
Elective path/specialty <b>Food Industry Machines and Refrigeration</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>part-time</b>	
No. of hours Lecture: <b>10</b> Classes: <b>6</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  Prof. Ewa Tuliszką-Sznitko, Ph.D.(Eng.), D.Sc. email: : ewa.tuliszka-sznitko@put.poznan.pl tel. 61 665 2111 Faculty of Machines and Transport ul. Piotrowo 3, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	The student has a basic knowledge of thermodynamics, fluid mechanics and economics.
2	<b>Skills</b>	The student knows how to carry out basic thermodynamic calculations, knows how to create engineering algorithms and knows how to analyze technological schemes.
3	<b>Social competencies</b>	The student is able to work in a group. The student knows how to prioritize tasks and knows how to work independently.
<b>Assumptions and objectives of the course:</b> The aim of the course is to understand the principles of rational acquisition, processing, transportation, distribution and use of energy, gaining knowledge of the balancing of energy systems, and deepening the knowledge of the impact of technological processes on environment.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. The student has knowledge of thermal energy management in a factory, knows the processing systems, knows the methods of energy accumulation and storage. - [K1A_W07 K1A_W23] 2. Student has the knowledge and understands the associated processes in industry and knows the systems of energy conversion from renewable resources. - [K1A_W07 K1A_W23] 3. Student has the basic knowledge necessary to analyze the energy costs and the knowledge to conduct an energy audit at the factory. - [K1A_W07 K1A_W23]		
<b>Skills:</b>		
1. The student knows how to optimize the use of energy in a factory. - [K1A_U03 K1A_U19 K1A_U23] 2. The student knows how to integrate information, interpret it and draw conclusions. - [K1A_U03 K1A_U19 K1A_U23] 3. The student is able to obtain information on the energy management from literature, the Internet, from a database, and from other sources. - [K1A_U03 K1A_U19 K1A_U23] 4. The student knows how to calculate the ratios of specific energy consumption in a food factory. - [K1A_U03 K1A_U19 K1A_U23] 5. He is able to prepare energy balances of power equipment. - [K1A_U03 K1A_U19 K1A_U23] 6. The student is able to assess potential risks to the environment resulting from the use of industrial technology. - [K1A_U03 K1A_U19 K1A_U23]		
<b>Social competencies:</b>		

1. The student understands the need for further education and knows how to broaden his knowledge in the field. - [K1A_K01 K1A_K02 K1A_K05]
2. The student is able to think and act in an entrepreneurial manner. - [K1A_K01 K1A_K02 K1A_K05]
3. The student understands the social aspects of energy saving and the use of energy from renewable sources. - [K1A_K01 K1A_K02 K1A_K05]

<b>Assessment methods of study outcomes</b>		
Written tests		
<b>Course description</b>		
Trends of the energy management in industrial and commercial sectors. Use of fuels. Thermal energy management: steam, steam boilers, steam generation. Energy consumption of various branches of food industry. Methods of saving energy. The energy management in a drying industry. Energy conversion systems. Characteristics of energy accumulation systems and energy storage. Calculation of the specific energy consumption in food industry. The investment cycle and cost analysis. The benefits from energy saving. The use of renewable energy. The energy audit.		
<b>Basic bibliography:</b>		
<b>Additional bibliography:</b>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Participation in lectures	15	
2. Preparation to pass the lecture test	6	
3. Presence at the lecture test	2	
4. Participation in classes	15	
5. Preparation for classes	8	
6. Consolidation of the knowledge acquired in classes	5	
7. Consultations	3	
8. Preparation to pass the classes test	2	
9. Presence at the classes test	1	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	57	2
Contact hours	36	1
Practical activities	0	0