

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Technical Thermodynamics		Code 1010401231010400043
Field of study TECHNICAL PHYSICS	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 3
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 %) 3 100% 3 100%
Responsible for subject / lecturer: Tomasz Martyński email: tomasz.martrynski@put.poznan.pl tel. 61 6653172 Faculty of Technical Physics Nieszawska 13a. 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge of experimental physics and mathematics.
2	Skills	podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej
3	Social competencies	podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej
Assumptions and objectives of the course: The student will learn the meaning of thermal equilibrium, what thermometers measure, different types of thermometers, the meaning of heat, how to calculate the involve heat flow, how heat is transferred by conduction, convection and radiation. How to relate the temperature, pressure and volume of ideal and real gas. How the interaction between gas molecules determine the properties of the gas, liquid and solid substance. How to calculate the work done by different thermodynamic systems. How to analyze adiabatic thermodynamic processes in an gas. Differences between reversible and irreversible processes. Efficiency of the heat engine. Relation between heat engine and refrigerators. How the second law of thermodynamics sets limits on the efficiency of the engine and refrigerators. What entropy mean, and how to calculate entropy in thermodynamic processes. Statistical view on entropy. Probability and entropy.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej - [-]		
2. x - [-]		
Skills:		
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej - [-]		
Social competencies:		
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej - [-]		
Assessment methods of study outcomes		
podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej		
Course description		

podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej		
Basic bibliography:		
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej		
Additional bibliography:		
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej		
Result of average student's workload		
Activity		Time (working hours)
1. podstawowa wiedza z fizyki doświadczalnej i analizy matematycznej		0
Student's workload		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	49	2
Practical activities	16	1