

Title <b>Technical Thermodynamics (Termodynamika techniczna)</b>	Code <b>1010401241010430699</b>
Field <b>TECHNICAL PHYSICS</b>	Year / Semester <b>2 / 4</b>
Specialty -	Course <b>core</b>
Hours Lectures: <b>2</b> Classes: <b>1</b> Laboratory: -    Projects / seminars: -	Number of credits <b>4</b>
	Language <b>polish</b>

**Lecturer:**

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**Status of the course in the study program:**

Core course of the study for Technical Physics, Faculty of Technical Physics.

**Assumptions and objectives of the course:**

Introduction to the theoretical and practical description of the heat and work in thermodynamic process in macro- and microsystems (phenomenological and statistical thermodynamics). Principles of the construction, efficiency and application of heat engines.

**Contents of the course (course description):**

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.

**Introductory courses and the required pre-knowledge:**

Basic knowledge of experimental physics and mathematics.

**Courses form and teaching methods:**

Lectures with help of multimedia and virtual experiments, classes plus individual work with students.

**Form and terms of complete the course - requirements and assessment methods:**

Written and oral examination, evaluation of the theoretical and practical skills. The semester grade is average note of all subjects.

**Basic Bibliography:**

1. D. Holiday, R. Resnick, J. Walker, ?Fundamentals of Physics?, vol. 2, Wiley, NYC 2001.
2. H. D. Young, R. A. Freedman, A. L. Ford, ?University Physics?, chap. 17-20, Person International Edition, San Francisco 2008.

3. J. M. Seddon, J. D. Gale, "Thermodynamics and Statistical Mechanics" Royal Society of Chemistry, Cambridge, 2001.
4. M. W. Zemansky, R. H. Dittman, "HEAT AND THERMODYNAMICS - An Intermediate Textbook", McGraw-Hill, NYC, 1997.

**Additional Bibliography:**

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