

<b>Course title: Thermodynamics I.</b>	<b>Neptun code: GEAHT401-a</b>
<b>Course coordinator:</b> name, position, scientific degree: <b>Dr. Péter Bencs, associate professor, Ph.D.</b>	
type and number of lesson: <u>lecture</u> /seminar/practical lesson/consultation: <b>20</b> / week or <u>semester</u>	
method of accountability: <u>colloquium</u> /practical mark/other	
curriculum location of the subject: <u>autumn</u> /spring	
pre-study conditions: -	
<b>The task and purpose of the subject:</b>	
The objective of this course is to introduce the basic principles of thermodynamics via real-world engineering examples, to show students how thermodynamics is applied in engineering practice. The course builds the foundation for students to become working professionals in the area of thermal systems engineering.	
<b>Course description:</b>	
<p>Thermodynamic concepts: system, system boundary, thermodynamic properties, state, processes.</p> <p>Energy, work and heat transfer: kinetic and potential energy, internal energy, work of shaft, energy, heat transfer, work of displacement, enthalpy.</p> <p>Thermodynamic properties of pure substances: Gibbs phase rule, pure substances, phase change, saturation and quality, superheated vapour, ideal gas law, compressibility factor, equations of other states, properties of gases.</p> <p>First law of thermodynamics (control mass, control volume): conservation of mass, conservation of energy, equilibrium processes, non-steady flow processes.</p> <p>Reversible and irreversible processes: effect of irreversibility on work and heat transfer.</p> <p>Entropy and the second law, applications of the second law.</p> <p>Analysis of thermodynamic cycles: work processes, cooling and heat pump heat and cooling cycles, Carnot cycle.</p> <p>Gas cycles: Brayton cycle. Steam cycle: Rankine cycle, modified Rankine cycle, cogeneration and combined cycle cycles.</p> <p>Heat conduction: one-dimensional heat conduction.</p>	
<b>Required literature:</b>	
<ol style="list-style-type: none"> <li>1. P. S. Schmidt, O. Ezekoye, J. R. Howell, D. Baker: Thermodynamics: An Integrated Learning System</li> <li>2. Y. A. Cengel, M. A. Boles: Thermodynamics: An Engineering Approach</li> <li>3. M. J. Moran, H. N. Shapiro: Engineering Thermodynamics</li> </ol>	
<b>Recommended literature:</b>	
<ol style="list-style-type: none"> <li>1. Dr. Czibere Tibor: Vezetékes hőátvitel. Miskolci Egyetemi Kiadó, 1998</li> </ol>	