

... THERMODYNAMICS....

(Environmental engineering, 3rd Year of study, 1st Semester)

Credits (ECTS): 4

Course category: Domain-specific discipline (optional)

Course holder: Lecturer Ilie BODALE, PhD

Objectives of the discipline:

The discipline objectives consist in study of the main thermodynamics process and heat transfer phenomena to understand the conversion of energy from household activities and industries and their impact on the balance of population well-being - environmental pollution.

Contents (syllabus)

Course (chapters/subchapters)
1. Thermodynamic systems, parameters and state functions.
2. The ideal gas. Ideal gas equation of state. Kinetic theory of ideal gas
3. The postulates and principles of thermodynamics
4. Applications of the first principle of thermodynamics: simple ideal gas transformations, determination of basal metabolic rate
5. Applications of the II principle of thermodynamics: the thermal engine, the refrigerator, the heat pumps
6. Irreversible processes and entropy production
7. Heat and substance transport processes: thermal conductivity, diffusion, thermodiffusion and radiation. The Stefan-Boltzmann law
8. Thermodynamics of processes far from thermodynamic equilibrium
9. Irreversible processes in biological structures

Practical activity
1. Mathematical operators used in thermodynamics
2. Thermocouple calibration and thermocouple measurements
3. Calibration of the semiconductor thermometer
4. The studies of isothermal, isobaric and isochore transformations using the gas laws device
5. Determination of thermal conductivity of air
6. The study of the distribution of molecules by energy
7. Determination of the specific heat of a solid and liquid
8. Determination of the latent heat of melting and crystallization of the substance
9. Verification of the Stefan-Boltzmann law
10. Determination of the adiabatic coefficient of air by the Clement-Desormes method
11. Applications of statistical thermodynamics

Bibliography

1. Cazacu A., Bodale I., Oancea S., 2021 – „Fenomene de transfer și operații unitare”, Iași, Ed. „Ion Ionescu de la Brad.
2. Bodale I., 2021 – „Termodinamică”, Suport de curs USV Iași;
3. Oancea S., „Fizica elementara”, Editura PIM, Iasi, 2005
4. Bodale I., 2022 – „Referate pentru laboratorul de termodinamică”, USV Iași.
5. Oancea S., Cazacu A., „Probleme rezolvate de fizică”, Editura PIM, Iasi, 2015

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Final exam	Written examination	70 %
Evaluation of the activity during the semester	Written and oral assessments during the semester	30 %

Contact

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