

## SYLLABUS

**1. Course title:**

Thermodynamics I

**2. Code:**

**3. Cycle of study:**

I

**4. ECTS credits:**

5

**5. Type of course:**

Mandatory

**6. Prerequisites:**

-

**7. Class restrictions:**

-

**8. Duration / semester(s):**

1

4

**9. Weekly contact hours and student workload:**

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
9.1. Lectures	4			Classes: 45
9.2. Seminars	3			Individual work: 81.67
9.3. Laboratory / Practice classes	1			In total: 126.7
	0			

**10. Faculty:**

Faculty of Mechanical Engineering

**11. Department/study program:**

Energetics and Thermofluid engineering, Production engineering, Mechatronics

**12. Lecturer:**

Ph.D. Sandira Eljšan, full professor

**13. Course aims:**

The aim of the course is to acquire theoretical knowledge and practical skills from the basics of Thermodynamics. As part of the course, it is necessary to familiarize students with the basic laws of ideal and real gases, as well as basic thermodynamic processes. Adopting these thematic areas, students get the basis for continuing the course through

Thermodynamics II (which is taken in the 5 th semester at the energy department), Basics of energy (production engineering) and Energy processes (Mechatronics).

#### 14. Learning outcomes:

At the end of the course, the student is expected:

- to recognize between ideal and real gases,
- to describe some simple thermodynamic problems,
- to solve simpler tasks from basic thermodynamic processes,
- to draw diagrams from water vapor
- to make simpler schemes from processes with water vapor.

#### 15. Course content:

Dynamics of processing teaching units by weeks of the semester:

- 1.Introduction. Thermodynamic quantities of state. Examples .
2. Basic laws of ideal and real gases. Examples .
3. Ideal gas mixtures. Examples .
- 4.First the Law of Thermodynamics. Internal energy and specific heat. Examples .
- 5.Work, power and p-v diagram. Enthalpy. Examples .
- 6 Changes in the state of ideal gases. Examples .
7. Mixing gases streams.
8. TEST I
- 9.Secondary law of thermodynamics. Examples.
10. Circular cycles and thermodynamic degrees of utilization. Examples .
11. Carnot circular cycle. Entropy. Examples .
- 12.Maximum work and exergy. Examples .
- 13.Water vapor. State quantities of water vapor.
14. Mollier's h-x diagram of water vapor. Steam processes. Examples
15. TEST II

#### 16. Learning methods:

Lectures with the use of multimedia tools, active learning techniques and with active participation and discussions students

- creation of tasks for auditory exercises with the involvement of students
- consultations with teachers on a weekly basis.

#### 17. Assessment methods:

The first test from assignments in the 8 th week, and the second in the 15 th week, i.e. in the last week of the semester. For those who do not pass tests (50 %), the collective written exam from the tasks is in the term of the final and remedial exam, after which the theory is taken.

Grade	described	by letter	points
5 (five)	Does not meet minimum criteria	F;FX	<54
6 (six)	meets the minimum criteria	E	54 -64
7 (seven)	Generally good, but with significant flaws	D	65-74
8 (eight)	Average, with noticeable errors	C	75-84
9 (nine)	Above average, with some errors	B	85-94
10 (ten)	Exceptional success without mistakes or with minor mistakes	A	95-100

#### 18. Assessment components:

Grading in the course:

- Test I 25 points (only tasks)
  - test II 25 points (only tasks)
  - theoretical final exam or remedial exam: 50 points
- Pre-examination requirements total number of points: 50 points  
Final exam: 50 points  
total number of points: 100 points.

#### 19. Mandatory reading list:

1. Martinovic D., H.Lulic i grupa autora: Termodinamika i termotehnika, Sarajevo, 2014
2. Galović, A: Termodinamika I, FSB, Zagreb, 2002
3. Fabris O.: Osnove inženjerske termodinamike, Pomorski fakultet u Dubrovniku, Dubrovnik 1994

#### 20. Additional reading list:

Eljšan S. Autorizirana predavanja, Tuzla, 2025

**21. Web sources:**

**22. Applicable from the academic year:**

2025/2026

**23. Adopted in the Faculty/Academy session:**