UNIVERSITY OF TUZLA UNIVERZITET U TUZLI

SYLLABUS

1. Course title:

Basics of heating, air conditioning and cooling systems

2. Code:

3. Cycle of study:

I

4. ECTS credits:

3

5. Type of course:

Elective

6. Prerequisites:

-

7. Class restrictions:

-

8. Duration / semester(s):

1 | 7

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2) (for two-semester courses)	Workload: (hours)	
9.1. Lectures	2		Classes:	33.75
9.2. Seminars	0		Individual work:	55.83
9.3. Laboratory / Practice classes	1		In total:	89.58

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronics

12. Lecturer:

Ph.D.Sandira Eljšan, full professor

13. Course aims:

Acquiring theoretical knowledge and skills, as well as adopting methods for independently solving simple problems in heating and air conditioning.

14. Learning outcomes:

At the end of the studied subject, the student is expected to know: differentiate heating systems, identify the basic elements of the heating and air conditioning system , calculate simpler practical problems of heating and air conditioning systems, compare the advantages and disadvantages of different heating systems.

15. Course content:

Dynamics of processing teaching units by weeks of the semester:
1. Introduction. Meteorological - climatic factors and their impact on heating and air conditioning.
2. Thermal comfort of the climate.
3. Heat losses.
4. Plant elements, characteristics, operating properties and calculations.
5. Pipe network sizing.
6. Gravity and pump heating regimes. Two-pipe and one-pipe gravity heating systems.
7. Different types of heating: surface heating, (panel, underfloor heating), steam heating. Gas heating. Central heating system regulation.
8. TEST I
9. District heating of the city. Thermal substations.
10. Heat pump heating, low-energy houses, "passive houses. • Solar heating and DHW heating.
11. Basics of ventilation and air conditioning.
12. Division of air conditioning systems.
13. Air distribution.
14. Calculation of basic air conditioning systems.
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:

-As part of the pre-exam obligations, students are required to prepare an individual or group project work (depending on the number of students in the year) that will cover a specific topic from the content of the course. The project work is sent electronically as well as in written form to the subject teacher for review and assessment, and then presented orally. For the completed and presented seminar work, the student can achieve up to 45 points.
-Also, as a pre-exam obligation, a report on the visit to see these facilities is submitted (up to 5 points).
- After the defended project assignment, the student takes the mandatory theoretical part of the exam, which can be written or oral, and takes the material covered in the lectures. The maximum number of points that a student can achieve on the theoretical exam is 50.

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:

Pre-exam requirements: 50 points
- Report on completed visits: 5 points
- project work 45 points
- final exam or make-up exam: 50 points (theory test)

total number of points: 100 points

19. Mandatory reading list:

1. Todorović B.: Projektovanje postrojenja za centralno grijanje; Beograd, 2009.

2. Todorović B.: Klimatizacija, Beograd, 2009.
3. Eljšan S: Tehnika grijanja, 2019.

20. Additional reading list:

1.Recknagel, Sprenger, Schrame, Čeperković: Grejanje i klimatizacija 05/06, Zagreb, 2012.
2. Eljšan S. : Authorized lectures, Tuzla, 2024

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: