SYLLABUS

1. Course title:

Refrigeration systems

2. Code:

3. Cycle of study:

I

4. ECTS credits:

4

5. Type of course:

Mandatory

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester(s):

I | 8

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2) (for two-semester courses)		Workload: (hours)
9.1. Lectures	3		Classes:	56,25
9.2. Seminars	1		Individual work:	56,08
9.3. Laboratory / Practice classes	1		In total:	112,3

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energetics and thermo fluid engineering

12. Lecturer:

PhD Izudin Delić, associate professor

13. Course aims:

The aim of the course is to provide students with the fundamental knowledge of processes and procedures, devices, plants, and components used for achieving, maintaining, and utilizing temperatures lower than the ambient temperature.

14. Learning outcomes:

Upon completion of the course, students are expected to gain knowledge about the architecture, utilization, and improvement of refrigeration systems commonly found in practice today. Students will be trained for the technical observation of refrigeration systems, the ability to select the structure and components, and the calculation of individual components according to a given task.

15. Course content:

01. Basics of Refrigeration Systems and Devices.
02. Historical Development of Refrigeration Devices.
03. Gas and Vapor Compression Refrigeration Systems.
04. Calculation of Cooling Load and Refrigeration System Capacity.
05. Methods of Achieving Low Temperatures.
06. Working Fluids in Refrigeration Systems.
07. Measures for Improving the Coefficient of Performance (COP).
08. Refrigeration Compressors.
09. Condensers in Refrigeration Systems.
10. Evaporators in Refrigeration Systems.
11. Additional Equipment of Refrigeration Devices.
12. Safety Equipment.
13. Ejector Refrigeration Systems. Absorption Refrigeration Systems.
14. Refrigeration Systems of Thermal Power Plants. Insulation.
15. Application Software.

16. Learning methods:

- **Lectures using multimedia tools, active learning techniques with active student participation and discussions;**
- **Preparation and presentation of group and individual seminar papers.**
- **Exercises: - conducted in the classroom, laboratory, and specialized companies with active student participation.**

17. Assessment methods:

After half of the semester (approximately 10 weeks), students take a written test covering the material from lectures and exercises up to that point. The test consists of problems as well as simple theoretical questions without the derivation of equations. Students can earn a maximum of 40 points on this test. At the end of the semester, students who did not pass the test during the semester take a written exam. As part of their pre-exam obligations, students are required to prepare an individual programming assignment that will cover a specific topic from the course content. The programming assignment is submitted in written form to the course instructor for review and grading, and then defended orally. For a completed and defended programming assignment, students can earn from 0 to 30 points. Additionally, for continuous activity in lectures and exercises throughout the semester, students can earn from 0 to 5 points (each unjustified absence reduces the score by 1 point). The final exam is oral. In the oral exam, students answer three randomly selected questions from the course syllabus covered in lectures and exercises that were not part of the test during the semester. The maximum number of points a student can earn on the oral exam is 25.
Assessments in all forms of knowledge are recognized as a cumulative exam if the achieved result is positive after each individual assessment and amounts to at least 50% of the total foreseen and/or required knowledge and skills.
To pass the course, a student must achieve a minimum of 54 cumulative points. Those who do not collect 50% of the points required for passing through assessments will take the scheduled final and retake exams.

Grade (Number)	Description	Letter Grade	Points
5 (five)	Does not meet the minimum criteria	F, FX	< 54
6 (six)	Meets the minimum criteria	E	54-64
7 (seven)	Generally good, but with significant shortcomings	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 errors or with minor errors	A	95-100

18. Assessment components:

- **Class Attendance: 5 points**
- **Programming Assignment during the semester: 30 points**
- **Test: 40 points**
- **Final Exam or Retake Exam: 25 points**
- **Total: 100 points**

19. Mandatory reading list:

1. Pavković B.: Tehnika hlađenja, Rijeka, 2013.
2. Vujić S.: Rashladni uređaji, Beograd, 1997.
3. Alić I., Eljšan S., Buljubašić I.: Rashladni sistemi, Tuzla, 2016.

20. Additional reading list:

1.H. Recknagel, Grijanje i klimatizacija, Interklima doo, Vrnjačka Banja, 2012.

21. Web sources:

https://www.bitzer.de/websoftware/

22. Applicable from the academic year:

2025./2026

23. Adopted in the Faculty/Academy session: