SYLLABUS

1. Course title:

CFD analysis

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 7

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	3		Classes:	33,75	
9.2. Seminars	0		Individual work:	67,23	
9.3. Laboratory / Practice classes	0		In total:	100,9	

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 basic knowledge about the application of software packages for CFD analysis in simple energy conversions and processes in energy systems and devices.

14. Learning outcomes:

Students are expected to master 2D and 3D modeling skills, as well as the preparation of models for CFD analysis. Students will be able to independently simulate and analyze fluid flow and heat transfer processes in energy, HVAC, and process equipment. Students will be trained for the analytical observation of the construction and operation of HVAC devices and components, as well as energy and process equipment.

15. Course content:

01. Fundamentals of CFD Techniques, Application, and Reasons for Application.
02. Examples of CFD Technique Usage.
03. Introduction to Software Programs for CFD Techniques.
04. Techniques for Creating 2D Models for CFD Simulation.
05. Techniques for Creating 3D Models for CFD Simulation.
06. Part Management.
07. Preparation of Finished Models for CFD Simulation.
08. Preparation of Finished Models for CFD Simulation.
09. Region and Boundary Management.
10. Visual Inspection of Surfaces.
11. Techniques for Control Volume Discretization.
12. Initial and Boundary Conditions.
13. Approximation of the Physical Model.
14. Presentation and Analysis of Results.
15. Preparation of Technical Reports.

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.**

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 during the semester. The programming assignment is defended orally during the final exam period. For a completed and defended programming assignment, students can earn up to 55 points, with 20 points awarded during the semester and 35 points during the final exam. 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. During the final exam, students orally defend parts of the programming assignment completed during the semester. The maximum number of points a student can earn on the oral exam is 35. 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: 20 points**
- **Test: 40 points**
- **Final Exam or Retake Exam: 35 points**
- **Total: 100 points**

19. Mandatory reading list:

1. Delić I., Ćosić S.: Aplikacije numeričkog modeliranja u mašinstvu, Soreli doo, Tuzla, 2020.

20. Additional reading list:

1. D.Anderson, J.Tannehill, R.Pletcher, Computational Fluid Mechanics and Heat Transfer, CRC Press, 2012.

21. Web sources:

http://www.cfd-online.com

22. Applicable from the academic year:

2025./2026

23. Adopted in the Faculty/Academy session: