SYLLABUS

1. Course title:

Fluid Mechanics II

2. Code:

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

I V

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:	95,83
9.3. Laboratory / Practice classes	1		In total:	152,1

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

ETFI

12. Lecturer:

dr.sci. Izet Alić, professor

13. Course aims:

Expanding knowledge in certain areas of fluid mechanics. Training students to solve simpler hydraulic calculations of pipelines. Familiarity with the flow of compressible fluid, basic laws and relations. Training students to solve computational problems of compressible fluid flow.

14. Learning outcomes:

After successfully completing the course, the student will be able to:
- describe ways of applying laws and phenomena in fluid mechanics when analyzing simple problems and processes in the flow of compressible fluids;
- apply theoretical knowledge from the field of analytical functions to the field of plane flow;
- choose an engineering approach in solving problems in the field of fluid flow through pipelines.

15. Course content:

1. Boundary layer theory layer. Turbulent flow.
2. Pipe roughness. Hydraulic calculation of pipelines. Calculation procedures for simple pipelines - pressure drop, flow and pipeline diameter.
3. Graphic representation of the energy line and the piezometer line. Calculation of pipelines of non-circular cross-section.
4. Circulation of fluid around the body. Frictional resistance. Form resistance. Resistances of some bodies. Hydrotunnels and wind tunnels.
5. Dynamics of a compressible fluid. The speed of sound. Flow regions according to Mach number. Basic equations of ideal gas flow.
6. Flow through nozzles and diffusers.
7. De Laval nozzle.
8. Shock wave.
9. Test 1
10. Plane flow of incompressible fluids. Current function. Potential flow.
11. Basic plane flows.
12. Axisymmetric flow of incompressible fluids. Basic axisymmetric flows. Plane and axisymmetric flow of compressible fluids.
13. Application of functions of complex variables. Complex potential and complex velocity.
14. Test 2
15. Introduction to numerical fluid mechanics.

16. Learning methods:

Lectures and exercises with the use of multimedia tools, active learning techniques and with the active participation and discussions of students. In addition, students have the opportunity to consult with the subject teacher and assistant.

17. Assessment methods:

2 tests (assignments) - written examination

final exam (theory) – oral (written) examination

The student must score at least 50% of the points on each test in order for the points scored on the test to be recognized. At the final exam, students who did not pass the tests first take the failed test (one or two). Those who passed both tests on the final exam take the theory. At the same time, it is necessary to win a minimum of 13.5 points (30%) in order to be able to receive a passing grade (if this is sufficient in addition to the points from the pre-examination obligations).
The grade is formed according to the number of accumulated points, and according to Article 107 of the Law on Higher Education TK.

Grade	Described	Letter	Points
5 (five)	Does not meet minimum criteria	F, FX	<54
6 (six)	Meets 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 occasional errors	B	85-94
10 (ten)	Exceptional achievement with no errors or with minor errors	A	95-100

18. Assessment components:

Class attendance: max. 5 points (the maximum number of points for attendance is obtained for a minimum of 90% attendance at lectures and exercises; with an increase in the number of absences, the number of points decreases proportionally).
Test 1 = 30 points
Test 2 = 20 points
Pre-exam requirements total 55 points
Final exam = 45 points

19. Mandatory reading list:

1. I. Demirdžić: Mehanika fluida I dio, MF Sarajevo, 1990.
2. M. Pečornik: Tehnička mehanika fluida, ŠK Zagreb, 1989.
3. K.Voronjec, N.Obradović: Mehanika fluida, GK Beograd, 1973.

20. Additional reading list:

21. Web sources:

22. Applicable from the academic year:

2023/2024

23. Adopted in the Faculty/Academy session: