SYLLABUS

1. Course title:

Fluid Mechanics I

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 **IV**

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, PM, MEH

12. Lecturer:

dr.sci. Izet Alić, professor

13. Course aims:

To acquaint students with basic laws, principles and phenomena in the field of fluid mechanics. To train students to solve simpler examples from the field of fluid mechanics, which can be encountered in engineering practice. Theoretically prepare students for the acquisition of knowledge and skills in professional and specialist subjects.

14. Learning outcomes:

After successfully completing the course, the student will be able to:
- explain the physical properties of fluids and their influence on the behavior of fluids at rest and in motion;
- define basic terms, quantities and laws in the field of fluid statics, fluid kinematics and fluid dynamics;
- apply the laws of conservation of mass, amount of movement and energy to the fluid flow;
- analyze fluid flow in pipes and open channels;
- critically apply knowledge of fluid mechanics in solving technical problems in engineering practice.

15. Course content:

1. Historical development of fluid mechanics. Definition of fluid, fluid as a continuum.
2. Physical characteristics of fluids. Forces acting on the fluid. Fluid statics. Basic equation of fluid statics.
3. Pressure force on submerged (flat) surfaces.
4. Pressure force on submerged surfaces (curves).
5. Buoyancy. Stability and swimming.
6. Relative rest of the fluid.
7. Test 1
8. Fluid kinematics. Euler's and Lagrange's approach to fluid motion analysis. Continuity equation.
9. Sources and sinks. Movement and deformation of a fluid particle. Classification of fluid movement.
10. Dynamics of an ideal fluid. Euler's equations. Bernoulli's integral of Euler's equations.
11. Law on the amount of movement. Highlighting (stationary and non-stationary).
12. Dynamics of a viscous fluid. Navie Stokes equations. Energy losses during fluid flow.
13. Fluid flow regimes: laminar and turbulent flow.
14. Dimensional analysis and similarity theory.
15. Test 2

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).
2 tests (tasks) x 25 = 50 points
Pre-exam requirements total 55 points
Final exam = 45 points

19. Mandatory reading list:

1. S. Delalić, I. Alić : Mehanika fluida I, Tuzla 2005.
2. I. Demirdžić: Mehanika fluida I dio, MF Sarajevo, 1990.

20. Additional reading list:

1. M. Pečornik: Tehnička mehanika fluida, ŠK Zagreb, 1989.
2. K.Voronjec, N.Obradović: Mehanika fluida, GK Beograd, 1973.

21. Web sources:

22. Applicable from the academic year:

2023/2024

23. Adopted in the Faculty/Academy session: