

SYLLABUS

1. Course title:

Hydraulics and pneumatics

2. Code:

3. Cycle of study:

4. ECTS credits:

5. Type of course:

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

9. Weekly contact hours and student workload:

| | Semester (1) | I | Semester (2) | (for two-semester courses) | | Workload: (hours) |
|------------------------------------|--------------|---|--------------|----------------------------|------------------|----------------------|
| 9.1. Lectures | 2 | | [] | | Classes: | 33,75 |
| 9.2. Seminars | 1 | | [] | | Individual work: | 55,9 |
| 9.3. Laboratory / Practice classes | 0 | | [] | | In total: | 89,65 |

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energy and Thermo-Fluid Engineering

12. Lecturer:

Ph.D. Almir Osmanović, Associate professor

13. Course aims:

To enable students with the basics and application of hydraulics and pneumatics.

14. Learning outcomes:

After successfully completing the course, the student will be able to:

- Understand the basic principles of operation and application of hydraulic and pneumatic systems.
- Identify and describe the function of the basic components of hydraulic systems (pumps, cylinders, valves, accumulators).
- Identify and describe the function of the basic components of pneumatic systems (compressors, cylinders, valves, air preparation).
- Use and interpret hydraulic and pneumatic diagrams using standard symbols.

15. Course content:

1. Introduction - hydraulics.
2. Fundamentals of hydraulics.
- 3 Hydraulic oils and fluids.
4. Hydraulic pumps and motors.
5. Hydraulic cylinders.
6. Hydraulic accumulators.
7. Elements for control and regulation of hydraulic systems.
8. First test
9. Introduction - Pneumatics.
10. Physical properties of compressed air.
11. Production of compressed air and tanks.
12. Preparation and distribution of compressed air.
13. Elements for control and regulation of pneumatic systems.
14. Pneumatic working elements.
15. Second test

16. Learning methods:

Lectures – Lectures present the theoretical part of the material accompanied by examples for easier understanding of the material. Lectures using multimedia tools, active learning techniques and active participation and discussions of students. Practical examples are worked on in auditory exercises, while acquiring practical skills related to the topic of the studied subject, active learning techniques and active participation and discussions of students. Consultations represent an individual or group form of support for students, where they have the opportunity to ask additional questions, clarify ambiguities and receive specific guidelines regarding the teaching material and assignments. Consultations with teachers on a weekly basis. Part of the teaching can also be organized through "distance learning", which is more closely regulated by the decision of the Senate.

17. Assessment methods:

Attendance at all classes is mandatory and a record is kept of it, on the basis of which the student receives a signature from the subject teacher after each semester. Due to illness or other justified reasons, a student may miss a maximum of 20% of classes.

A student has the right to take each individual knowledge assessment. After half of the semester, students take a written test (1 partial exam - theory and assignments) that covers the topics covered in lectures and exercises so far. All students in the course take the test at the same time, which achieves uniformity in the level of knowledge being tested, as well as the conditions under which the student takes the exam. The test consists of tasks, multiple-choice tasks, simple recall tasks or essay tasks. On 1 test - assignments, a student can achieve a maximum of 20 points, and on 1 test - theory, a maximum of 20 points, in order to pass the test, they must achieve a minimum of 50% of points. A student who has not passed the exam can take the exam again on the following test dates. The second test (2 partial exams - theory and assignments) is taken by students at the end of the semester, the scoring system is the same as for the first test. The final exam is oral. In the oral exam, the student answers questions drawn from the subject topics covered in the lectures. The oral exam can be passed if the student answers all the questions correctly. The maximum number of points in the oral exam is 20.

In order to pass the course, the student must achieve a minimum of 54 cumulative points.

Grading system: (40)+(40)+(20)=100

| 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:

Grading will be based on the following activities:

| | |
|---|------------|
| PRE-EXAM OBLIGATIONS (total points): | 80 |
| Tests - tasks (2 x 20 points) | 40 |
| Tests - theory (2 x 20 points) | 40 |
| FINAL EXAM (total points): | 20 |
| TOTAL: | 100 |

19. Mandatory reading list:

1. A. Osmanović; E. Trakić (2021). Hidraulika. Tuzla: In-scan.
2. A. Osmanović; B. Šarić; M. Čabaravdić; E. Trakić, (2018). Pneumatika I dio - komponente. Tuzla: Off-set.

20. Additional reading list:

1. A. Vacca; G. Franzoni (2021). Hydraulic Fluid Power - Fundamentals, Applications, and Circuit Design. New York: Wiley.

21. Web sources:

<https://tu-dresden.de/ing/maschinenwesen/imd/fms/studium>

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: