SYLLABUS

1. Course title:

Applied mechatronics

2. Code:

3. Cycle of study:

I

4. ECTS credits:

3

5. Type of course:

Elective

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

I | III

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	0			Individual work:	56,08
9.3. Laboratory / Practice classes	1			In total:	89,83

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energy and thermo-fluid engineering, Production engineering, Mechatronics

12. Lecturer:

Ph.D. Almir Osmanović, Associate professor

13. Course aims:

To enable students to analyze and understand complex mechatronic systems in various applications.

14. Learning outcomes:

After successfully completing the course, the student will be able to:
Identifies and selects appropriate mechanical, electrical, and electronic components for a mechatronic system.
- Integrates sensors and actuators with microcontrollers or other development platforms.
- Programs microcontrollers to receive signals from sensors and control actuators in real time.
- Builds and tests functional prototypes of simple mechatronic systems.
- Documents the integration and prototyping process, including electrical schematics and program code.

15. Course content:

1. Introduction to applied mechatronics.
2. Basic elements of electrical circuits and circuit analysis.
3. Basic electronics.
4. Characteristics of dynamic systems.
5. Analog signal processing and operational amplifiers.
6. Electric motors.
7. First test.
8. Sensors.
9. Digital circuits.
10. Actuators.
11. Actuator control.
12. Programming and connecting microcontrollers.
13. Basic control systems.
14. Mechatronic systems.
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 with 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 course 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) that covers the topics covered in the lectures 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, and simple recall tasks. On 1 test, a student can achieve a maximum of 22.5 points, and to pass the test, they must achieve a minimum of 50% points. A student who has not passed the exam can take the exam again on the following test dates. Students take the second test (2 partial exams) at the end of the semester, the scoring system is the same as on the first test. As part of the pre-examination requirements, students are required to prepare an individual or group seminar paper on a given topic. The seminar paper is submitted in writing to the subject teacher, and then presented orally. All students in the group participate in the preparation and presentation of the group seminar paper, whose participation is evaluated individually. For the completed and presented seminar paper, a student can achieve 0-45 points.
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 10.
In order to pass the course, a student must achieve a minimum of 54 cumulative points.

Grading system: (45)+(45)+(10)=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):	**90**
Active participation during classes - Seminar paper	**45**
Tests (2 x 22.5 points)	**45**
FINAL EXAM (total points):	**10**
TOTAL:	**100**

19. Mandatory reading list:

1. Biswanath S. (2023). Introduction to Mechatronics An Integrated Approach. Springer

20. Additional reading list:

1. M. Jouaneh (2013). Fundamentals of Mechatronics. Cengage Learning

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: