

SYLLABUS

1. Course title:

Fundamentals of mechatronic engineering

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	0		[]		Individual work:	56,00
9.3. Laboratory / Practice classes	1		[]		In total:	89,75

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronica

12. Lecturer:

Ph.D. Almir Osmanović, Associate professor

13. Course aims:

To enable students with the fundamental knowledge and skills necessary for the design, modeling, and analysis of mechatronic systems and their components.

14. Learning outcomes:

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

Understand the fundamental concepts and principles of mechatronic engineering.

- Describes the process of developing a mechatronic product.
- Creates and defines specifications for a mechatronic product.
- Designs models of mechatronic parts and assemblies.
- Applies environmental and manufacturing design principles when designing mechatronic components.
- Uses software to conduct basic linear and nonlinear analyses.
- Interprets the results of dynamic simulations of mechatronic systems.

15. Course content:

1. Introduction, basics of mechatronic engineering.
2. Development of a mechatronic product.
3. Analysis and constraints during the development and design of a new product.
4. Design of mechatronic parts.
5. Design of mechatronic assemblies.
6. Preparation of technical documentation.
7. First test.
8. Design for the environment.
9. Design for production.
10. Prototyping.
11. Introduction to computer-aided engineering.
12. Basics of analysis of mechatronic components and systems.
13. Dynamic simulations.
14. Impact of new technologies (augmented and virtual reality).
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 laboratory exercises, while acquiring practical skills related to the topic of the subject being studied, 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) 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, 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 - assignments (2 x 22.5 points)	45
FINAL EXAM (total points):	10
TOTAL:	100

19. Mandatory reading list:

1. I. Šarić, A. Muminović (2020). Industrijski dizajn. Mašinski fakultet Sarajevo.
2. Kececi E. Faruk (2019). Mechatronic components roadmap to design. Butterworth-Heinemann.

20. Additional reading list:

1. Karl T. Ulrich, Steven D. Eppinger, Maria C. Yang (2020). Product Design and Development. McGraw-Hill Education

21. Web sources:

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22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session:

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