

SYLLABUS

1. Course title:

Fundamentals of mechatronic

2. Code:

3. Cycle of study:

I

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester(s):

1

V

9. Weekly contact hours and student workload:

	Semester (1)	I	Semester (2)	(for two-semester courses)		Workload: (hours)
9.1. Lectures	3				Classes:	56,25
9.2. Seminars	1				Individual work:	94,17
9.3. Laboratory / Practice classes	1				In total:	150,4

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronics

12. Lecturer:

PhD Mirza Bećirović, assistant professor

13. Course aims:

The main goal of execution of teaching from the course "Basics of Mechatronics" is an understanding of nature, function and role of the elements which form a mechatronic system and mastering the necessary theoretical and practical skills in the field of study cases in order to increase knowledge in the field of mechatronic systems as well as competitive

advantages of mechatronic system through improving the efficiency of the process and their successful integration with other segments in production processes.

14. Learning outcomes:

At the end of the semester, successful students, who have continuously fulfilled their obligations throughout the entire teaching period, will be able to understand what mechatronics is, to recognize a mechatronic system, and to be able to independently make decisions when the use of mechatronics makes sense.

15. Course content:

1. Introductory lectures.
2. Basic concepts of mechatronics; Concept and definition of system;
3. Actuators; Division and their role in mechatronic system;
4. Types of actuators; New actuators;
5. Sensors; Division and their role in mechatronic system;
6. Types of sensors;
7. Modeling; Mathematical modeling of mechatronic system; Models of mechatronic systems;
8. First test;
9. Algebra of transfer functions;
10. Automatic control of systems; Types of regulators;
11. Control with open and closed feedback;
12. Robot control;
13. Artificial intelligence-neural networks;
14. Programmable logic controllers;
15. Second test

16. Learning methods:

- Lectures – theoretical lectures, active two-way communication between student and professor, mandatory student attendance;
- Auditory exercises – problem solving with tasks related to the topic of the subject being studied, active two-way communication between student and assistant, mandatory attendance at exercises;
- Written (from the theoretical part and tasks);
- Seminar/graphic works – independent work of the student on solving the problem set;
- Consultations – clarification of any ambiguities related to the topic

17. Assessment methods:

- Defense of seminar/graphic works – the student defends his/her work before the professor/assistant – answers the questions asked;
- Written (from the theoretical part and assignments) – the student solves the questions/assignments set in a given period of time related to the topic of study;
 - Laboratory exercise report – submitting a report on activities related to the implementation of certain laboratory exercises, answering the questions asked by the assistant;
 - Final exam – oral answer to the questions asked by the professor;
 - Make-up exam (written) – solving the questions/assignments set in a given period of time related to the topic of study;
 - Make-up exam (oral) – oral answer to the questions asked.

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

Grading scale is as follows:

Grade	Description	Letter/Points
5 (five)	Does not meet minimum criteria	F <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 some errors	B 85-94
10 (ten)	Exceptional with no or minor errors	A 95-100

18. Assessment components:

Grading will be based on the following activities:

- Attendance at classes = 0 points.
- Seminar/Graphic work = 20 points.
- Test tasks $(2 \times 10) = 20$ points.
- Theory tests $(2 \times 20) = 40$ points.
- Pre-exam obligations = 80 points.
- Final exam = 20 points.
- Total = 100 points.

When solving the obligations related to knowledge testing, the student must earn more than 50% of the maximum number of points prescribed for a given activity. If the student does not earn the required number of points from a certain form of knowledge testing, he/she will take a make-up exam from the given segment of knowledge testing.

19. Mandatory reading list:

1. Šarić B, Trakić E. , Osnovi mehatronike sa rješenim zadacima, Univerzitet u Tuzli, Mašinski fakultet 2019. ;
2. Arzberger P., Wolfgang E., 2004. Fachtheorie Mechatronik. Troisdorf: Bildungsverlag;
3. Iserman R., 2003. Mechatronic Systems. London: Springer-Verlag;

20. Additional reading list:

1. Nordmann R. und Birkhofer H.: Maschine-elemente und Mechatronik I. Shaker Verlag, Aachen, 2002. ;

21. Web sources:

<https://www.mtu.edu/mechatronics/>

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: