SYLLABUS

1. Course title:

Process computer technique

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

Mandatory

6. Prerequisites:

7. Class restrictions:

Students of the fourth year study at the Faculty of Mechanical Engineering department of mechatronics (I cycle of studies)

8. Duration / semester(s):

I **VIII**

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2) (for two-semester courses)		Workload: (hours)
	I			
9.1. Lectures	3		Classes:	56,25
9.2. Seminars	1		Individual work:	85,42
9.3. Laboratory/Practice classes	1		In total:	141,6

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronics

12. Lecturer:

Dr. sci. Mirza Bećirović, Assistant professor

13. Course aims:

Acquiring basic knowledge related to process computer technology, monitoring, control, data transmission and acquisition.

14. Learning outcomes:

Upon successful completion of this course, students will be able to: Model and design a mechatronic real-time system using finite state machines. Create and program a simpler mechatronic embedded real-time system according to a given target functionality. Analyze and interpret the results of computer monitoring of a real-time system (using graphically based visualization software) in a mechatronic application, in order to increase the efficiency of the mechatronic system.

15. Course content:

1. Introduction to technical processes, mechatronic systems and automation.
2. Selection of electronic actuators.
3. System control concept, generic architecture, centralized and distributed control systems.
4. Process monitoring, fault detection and diagnostics.
5. Selection of controllers, sensors, actuators and data acquisition elements.
6. Data transmission system, communication networks.
7. First partial test
8. Real-time systems classification and examples.
9. Design and modeling of mechatronic real-time systems.
10. Hardware and software aspects of embedded real-time systems, microcontroller platform architecture.
11. Real-time programming of embedded mechatronic systems (programming of I/O ports, external interrupts, timers)
12. Real-time operating system (RTOS), process scheduling algorithms.
13. Mutual exclusion of processes, communication between tasks.
14. SCADA systems (monitoring systems).
15. Second partial test.

16. Learning methods:

Lectures, exercises, seminar works, consultations.

17. Assessment methods:

The methods of knowledge assessment are:
• 2 tests (tasks),
• Seminars works,
• Final written or oral exam
• Make-up exam; theory and task test

During the semester, there will be two tests, each containing one written task and one practical task in the laboratory. During the semester, it is necessary to complete and orally present a seminar paper. After achieving the minimum required number of points through tests and seminar paper, the student takes the final exam, which consists of a written or oral part (theory). Before the final exam, a student who has not achieved 50% of points on any of the tests can take a make-up exam.

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

Grade	Descriptive	Letter	For the number of points achieved
5 (five)	"does not meet the minimum criteria"	F,FX	<54 points
6 (six)	"meets the minimum criteria"	E	54-64 points
7 (seven)	"generally good, but with significant shortcomings"	D	65-74 points
8 (eight)	"average, with noticeable errors"	C	75-84 points
9 (nine)	"above average, with some errors"	B	85-94 points
10 (ten)	"exceptional success with no errors or with minor errors"	A	95-100 points

18. Assessment components:

Students mark is based on the total number of points a student earned by completing pre-exam requirements and exams, according to the quality of the acquired knowledge and skills, and contains a maximum of maximum 100 points, and is determined according to the following scale:

Student obligation	points
2 pre-exam test	2x20
Seminars eorks	40
(pre-exam requirements, total)	(80)
Final exam: - written (theory)	20

Total: 100 points

19. Mandatory reading list:

1. Avdagić Z.: Računarski sistemi u realnom vremenu, Elektortehnički fakultet, Sarajevo 2001.
2. Patrick K.: Mechatronic Systems and Process Automation, Taylor i Francis Group 2018.

20. Additional reading list:

1. R.Betz, Introduction in Real-Time Operating Systems, University of Newcastle, Australia 2001.
2. J. Wikander, B. Svenson: Real-Time Systems in Mechatronic Aplications, Springer Verlag, 2010.

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: