SYLLABUS

1. Course title:

Automatic control 1

2. Code:

3. Cycle of study:

I

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

I | VII

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:	95,33
9.3. Laboratory / Practice classes	1		In total:	151,5

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronic

12. Lecturer:

Ph.D. Almir Osmanović, Associate professor

13. Course aims:

To enable students for the analysis and synthesis of a continuous automatic control system.

14. Learning outcomes:

After successfully completing the course, the student will be able to:
Basics of automation system elements
- Analyze the elements of the block diagram of a typical control circuit.
- Calculate the transfer function of the automation from its differential equation.
Analysis and synthesis of continuous and time-invariant automatic control systems.
- Analyze the time response of basic dynamic members.
- Sketch the transition function of basic automation elements.
- Analyze the frequency response.
- Apply stability analysis procedures to continuous and time-invariant systems.

15. Course content:

1. Introduction to automatic control.
2. Mathematical models of dynamic systems.
3. Laplace transforms.
4. Transfer functions.
5. Characteristic equation and poles of the system.
6. Block diagrams.
7. Steady state error.
8. First test
9. System transient state.
10. Dominant poles and zeros.
11. Stability of linear systems, Routh-Hurwitz stability criteria.
12. GMK (rooth-locus) Method.
13. PID controllers.
14. Bode diagrams.
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.
Practical examples are worked on in auditory and laboratory exercises, with the acquisition of practical skills related to the topic of the studied subject, 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 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.
The student has the right to take each individual knowledge assessment. After half of the semester, students take a written test (1 partial exam - theory test and test tasks) that covers the topics covered in lectures and exercises so far. All students in the course take the test simultaneously, 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 - tasks, a student can achieve a maximum of 20 points and from the test-theory 22.5 points, and 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 test and test tasks) 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 lectures and exercises. The oral exam can be passed if the student answers all the questions correctly. The maximum number of points on the final oral exam is 15.
In order to pass the course, the student must achieve a minimum of 54 cumulative points.

Grading system: (40)+(45)+(15)=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): 84
Tests - tasks (2 x 20 points) 40
Tests - theory (2 x 22.5 points) 45

FINAL EXAM (total points): 15

TOTAL: 100

19. Mandatory reading list:

1. Richard C. Dorf, Robert H. Bishop (2022). Modern Control Systems. Harlow: Pearson Education.

20. Additional reading list:

1. Nise, N. S. (2011). Control system engineering. New York: John Wiley & Sons, inc.

21. Web sources:

https://www.kth.se/student/kurser/kurs/EL1010?l=en

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: