SYLLABUS

1. Course title:

Automatic regulation

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 | VIII

9. Weekly contact hours and student workload:

Semester (1)	I	Semester (2)		(for two-semester courses)	Workload: (hours)
9.1. Lectures	2			Classes:	22,50
9.2. Seminars	0			Individual work:	56
9.3. Laboratory / Practice classes	0			In total:	78,5

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energy and Thermo-Fluid Engineering

12. Lecturer:

Ph.D. Almir Osmanović, Associate professor

13. Course aims:

To enable students to understand the basic terms and principles of automatic regulation.

14. Learning outcomes:

After successfully completing the course, the student will be able to:
- Understand the basic concepts and terminology of automatic control.
- Model linear dynamic systems using differential equations and transfer functions.
- Analyze the response of first and second order systems to standard input signals.
- Describe the function and characteristics of basic sensors and actuators in control systems.
- Sketch block diagrams of control circuits and determine closed-loop transfer functions.

15. Course content:

1. Basic concepts from the theory of control and regulation systems.
2. Function and structure of control systems.
3. Mathematical modeling of physical systems.
4. Transfer functions.
5. Analysis in the time and frequency domain.
6. Regulation devices.
7. First test.
8. Components of regulation systems: sensors.
9. Components of regulation systems: actuators.
10. Methods of automation and regulation of hydraulic systems.
11. Methods of automation and regulation of pneumatic systems.
12. Control systems in energy processes.
13. Microcontrollers in energy processes.
14. Examples of automatic regulation systems in energy facilities, processes and 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 ensures uniformity in the level of knowledge being tested, as well as the conditions under which the student takes the exam. The test consists of multiple-choice tasks, simple recall tasks or essay tasks. A student can earn a maximum of 20 points on 1 test, and in order to pass the test, they must earn a minimum of 50% of 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. As part of the pre-exam obligations, students are required to write individual or group seminar papers on a given topic. Seminar papers are submitted in writing to the course assistant and the lecturer, and then presented orally. For the completed and presented seminar papers, the student can achieve 0-35 points.
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 in the oral exam is 25 points.
In order to pass the course, the student must achieve a minimum of 54 cumulative points.

Grading system: (35)+(40)+(25)=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):	**75**
Active participation during classes - seminar papers	**35**
Test - theory (2x20 points)	**40**
FINAL EXAM (total points):	**25**
TOTAL:	**100**

19. Mandatory reading list:

1. F. Ebel, S. Idler, G. Prede, D. Scholz (2008). Fundamentals of automation technology. Festo.
2. D. Šešlija (2020). Implementacija automatskih sistema: Pneumatski sistemi. Novi Sad: FTN.

20. Additional reading list:

1. Dimitrijević P. (1989). Osnovi automatizacije sa elementima hidraulike, pneumatike i fluidike. Beograd: Viša tehnička mašinska škola.

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session: