SYLLABUS

1. Program Information

1.1 Higher education institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Department of Automation
1.4 Field of study	Automation, Applied Informatics and Intelligent Systems
1.5 Cycle of studies	Bachelor
1.6 Study Programme/Qualification	Intelligent Automation Systems (dual, in English language)
1.7 Form of education	IF – full-time education
1.8 Course code	46.00

2. Course information

2.1 Course title					**Industrial Training**	
2.2 Course lecturer						
2.3 Seminar / Laboratory / Project Lecturer					*Conf.dr.ing. Roxana Rusu-Both (program responsible)* *Ing. Călin Bogar (Emerson)*	
2.4 Year of study	3	2.5 Semester	2	2.6 Type of assessment		V
2.7 Course status	Formative category *(DF, DS, DC)*					DS
	Optionality *(DOB, DOP, DFac)*					DOB

3.Total estimated time

3.1 Number of hours per week	36	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		30
3.2 Number of hours per semester	180	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		180

3.3 Distribution of time allocation (hours per semester) for:	HEI	CO
(a) Study based on textbook, course support, bibliography, and notes		
(b) Additional documentation in library, specialized electronic platforms, and fieldwork		5
(c) Preparation of seminars/laboratories, assignments, papers, portfolios and essays		
(d) Tutoring		5
(e) Examinations		10
(f) Other activities:		
3.4 Total individual study hours (sum (3.3(a)... 3.3(f)))		20
3.5 Total hours per semester (3.2+3.4)		200
3.6 Number of credits per semester		8

(HEI = Higher Education Institution, CO = Company)

4. Prerequisites (where applicable)

4.1 Curriculum Prerequisites	• Core courses in automation, process control, and data acquisition.
4.2 Competency Prerequisites	• Basic understanding of industrial control systems and data acquisition.

5. Conditions (where applicable)

5.1. Course Organization Conditions	• Conducted at Emerson, using real-world industrial equipment, software (DeltaV, Ovation), and internal procedures.
5.2. Seminar / Laboratory / Project organization conditions	• Attendance and active participation in all on-site activities and project-related tasks are mandatory.

6. Specific Competencies Acquired

Professional Competencies	• PC01 Adjust engineering designs • PC02 Analyse test data • PC06 Define technical requirements • PC08 Design automation components • PC12 Gather technical information • PC13 Interact professionally in research and professional environments • PC14 Manage personal professional development • PC21 Report analysis results • PC25 Use technical drawing software • PC26 Use information technology tools • PC30 Design control systems
Transversal Competencies	• TC01 Apply knowledge of science, technology and engineering • TC03 Demonstrate responsibility • TC04 Work in teams • TC05 Interpret mathematical information

7. Learning outcomes

Knowledge:	• The student will be able to **explain control system concepts and engineering workflows** in the context of DeltaV and Ovation platforms.
Skills:	• The student will be able to **design, configure, and simulate** process control logic using industrial software tools. • The student will be able to **develop control strategies, configure graphics, and implement industrial standards** in real-world scenarios.
Responsibility and autonomy:	• The student will be able to **collaborate effectively** with team members and supervisors in project-based tasks. • The student will be able to **demonstrate initiative and accountability** in completing assigned tasks and final reporting.

8. Course Objectives

8.1 General objective of the course	• To provide hands-on industrial experience in the **implementation, testing, and documentation of control projects**, preparing students for careers in industrial automation and process control.
8.2 Specific objectives	• To familiarize students with **practical tasks in DeltaV and Ovation systems**. • To develop skills in **control logic design, SFC, PID tuning, graphics configuration, and simulation**. • To enhance the ability to work in industrial teams and meet real-world engineering challenges. • To prepare students to apply **industrial standards (e.g., KKS)** and company-specific workflows.

9. Contents

9.1 Lectures	No. of hours		Teaching methods	Obs.
9.2 Seminar / laboratory / project	Hours HEI	Hours CO	Teaching methods	Obs.
1. DeltaV System A. **Valve Array Project:**		100		

• Part 1: Design and implementation of control logic and modules for flow direction between 3 preparation reactors and 6 storage reactors (Graphics, Control Modules, SFC logic). • Part 2: Creation of logic for solution preparation in batch processes and transfer to storage reactors (including communication with previous flow direction logic). **B. Room Temperature Control Project:** • Development of a cascade control loop for room temperature and thermal agent (Control Modules, PID, Graphics, and simulation). **C. Demo project:** • Team-based mini-project in the department's field, consolidating learned skills and knowledge.				
2. Ovation System Practice **A. Industry Overview:** • Introduction to Ovation platform, plant interactions, and site-specific applications. **B. Standards and Consistency:** • KKS (Kraftwerks-Kennzeichen-System) standard overview. **C. Ovation System:** • Control sheets, device sheets, logic building, algorithm parameters, signal diagrams, and point info. **D. Control Strategy:** • Device feedbacks, analog measurements, priority and sequence algorithms. E. **Graphics and Visualization:** • Graphics creation, editing, shortcut usage, simulation, documentation, and final graphics exercises.		80		
Bibliography • Emerson technical manuals and internal standards. • Additional documentation and standards (KKS, process control references). • Internal Emerson documentation and Sharepoints (PMO, SMO, etc.) • Internal Tools and Processes, Emerson Standards and Guidelines.				

10. Correlation of course content with the expectations of the epistemic community representatives, professional associations, and major employers in the field related to the program

The practical work addresses **current industrial practices and tools (DeltaV, Ovation)**, reflecting the **expectations of major employers** (e.g., Emerson) and professional associations. It ensures **real-world engineering application** of academic knowledge, preparing students for competitive roles in automation and control systems.

11. Evaluation

Activity Type	Evaluation criteria	Evaluation methods	Weight in final grade
11.1 Lecture			
11.2 Seminar/ Laboratory/Project	**Minimum 180 hours attendance, task execution, supervisor feedback, teamwork and final report quality**	Practice notebook, project report, oral defense	100%
11.3 Minimum Performance Standard • Minimum 180 hours of active participation. • Completion of assigned DeltaV and Ovation tasks. • Submission of final report and successful oral defense (grade $\geq$ 5).			

Date of completion:	Lecturers	Title First Name LAST NAME	Signature
15.09.2025	Course		
	Applications	Bogar Calin	

Date of approval by the Department of Automation Council 24.11.2025 Date of approval by the Faculty of Automation and Computer Science Council 28.11.2025	Director of the Department of Automation Prof.dr.ing. Honoriu VĂLEAN Dean Prof.dr.ing. Vlad MUREȘAN