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	44.20

2. Course information

2.1 Course title	**Applications of Process Automation Systems**					
2.2 Course lecturer						
2.3 Seminar / Laboratory / Project Lecturer	*Dr.ing. Alin Burz (Emerson)* *Ing. Raluca Andrei (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)*					DOP

3.Total estimated time

3.1 Number of hours per week	4	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		4
3.2 Number of hours per semester	56	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		56

3.3 Distribution of time allocation (hours per semester) for:	HEI	CO
(a) Study based on textbook, course support, bibliography, and notes	0	8
(b) Additional documentation in library, specialized electronic platforms, and fieldwork	0	2
(c) Preparation of seminars/laboratories, assignments, papers, portfolios and essays	0	5
(d) Tutoring	0	1
(e) Examinations	0	3
(f) Other activities:	0	0
3.4 Total individual study hours (sum (3.3(a)... 3.3(f)))	0	19
3.5 Total hours per semester (3.2+3.4)	0	75
3.6 Number of credits per semester	0	5

(HEI = Higher Education Institution, CO = Company)

4. Prerequisites (where applicable)

4.1 Curriculum Prerequisites	• Digital transformation
4.2 Competency Prerequisites	• General knowledge of Ovation and DeltaV DCS

5. Conditions (where applicable)

5.1. Course Organization Conditions	NA
5.2. Seminar / Laboratory / Project organization conditions	• Computer, Specific software

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 • 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:	• Know the structure of modern process automation systems. • Know how to apply control strategies.
Skills:	• Ability to configure hardware modules in Ovation and DeltaV systems • Ability to create logic and graphics using templates and macros • Ability to configure alarms • Ability to program sequences and implement batch processes
Responsibility and autonomy:	• Take responsibility for the implementation of control strategies using Ovation or DeltaV systems

8. Course Objectives

8.1 General objective of the course	• To provide students with the technical expertise and practical skills required to design, configure, and manage process automation systems using modern equipment.
8.2 Specific objectives	• Analyse equipment and identify typical classes • Design typicals for logic and graphics • Analyse process and identify classes of stages • Implement logic and graphics using typicals • Develop models for testing • Perform testing

9. Contents

9.1 Lectures	No. of hours		Teaching methods	Obs.
NA	NA		NA	NA
Bibliography				
9.2 Seminar / laboratory / project	Hours HEI	Hours CO	Teaching methods	Obs.
1. Introduction to identification of equipment typicals	0	4	Presentation of examples, description of software	
2. Design of typicals (classes).	0	4		
3. Creating instances using typicals (classes).	0	4		
4. Fundamentals of batch processes.	0	4		

5. Programming stages (phases) and transitions.	0	4	programming environments, additional explanations, exercises, discussions	
6. Creating models for testing.	0	4		
7. Testing processes and documentation.	0	4		
8. Templates, macro and reuse of software between projects.	0	4		
9. Best practices for HMI design using macro.	0	4		
10. Best practices for logic design using macro.	0	4		
11. Identification of points in power and water industry: KKS and RDS-PP.	0	4		
12. Integration of graphics, logic and alarms.	0	4		
13. Internal tests: scenarios and reports.	0	4		
14. Fundamentals of acceptance tests.	0	4		

Bibliography

1. PCSD Books Online-DeltaV
2. PAS002-PAS003-Engineering Level 2
3. OVMAN91-Graphics Language Reference Manual
4. OVREF1100-Algorithms Reference Manual
5. OVREF1007-Maintaining Your Ovation System
6. OVREF1140-Record Types Reference Manual
7. Designation Systems for Power Plants (KKS, RDS-PP)

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 course curriculum is designed to comply with the established standards and guidelines of the process automation systems, guaranteeing that students gain the competencies necessary for professional certification. Course focus is on practical applications of obtained knowledge on process automation systems. The course offers an in-depth exploration of different process stages.

11. Evaluation

Activity Type	Evaluation criteria	Evaluation methods	Weight in final grade
11.1 Lecture	NA	NA	NA
11.2 Seminar/ Laboratory/Project	Practical execution skills, conceptual explanation, troubleshooting and debugging, use of tools	Practical applications	100%
11.3 Minimum Performance Standard			
5 out of 10 points			

Date of completion: 11.05.2025	Program responsible	Conf.dr.ing. Roxana Rusu-Both	

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