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	44.10

2. Course information

2.1 Course title					**Solutions with Integrated Technologies**	
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 functionality of Equipment Modules in DeltaV systems. • Implement control strategies for Phase Classes.
Skills:	• Ability to configure and manage Equipment Modules an Phases within DeltaV systems • Ability to validate system functionality and performance verification against expected outcomes
Responsibility and autonomy:	• Take responsibility for the implementation and optimization of batch systems in DeltaV

8. Course Objectives

8.1 General objective of the course	• To equip students with the technical expertise and practical skills necessary to design, configure, and manage batch processes within Distributed Control Systems (DCS).
8.2 Specific objectives	• Configure Equipment Module Classes • Configure Phase Classes • Performing internal test • Analyse of typicals. • Configure Control macros for typicals. • Configure Graphic macros for typicals. • Configure Logics implementation. • Configure Graphic implementation.

9. Contents

9.1 Lectures	No. of hours		Teaching methods	Obs.
9.2 Seminar / laboratory / project	Hours HEI	Hours CO	Teaching methods	Obs.
1. Introduction Equipment Modules (parameters and functionality). Configuration concepts.	0	4	Presentation of examples, description of software	
2. Configure Equipment Module Classes.	0	4		
3. Configure Equipment Module Instances.	0	4		

4. Internal Test on Equipment Module.	0	4	programming environments, additional explanations, exercises, discussions	
5. Unit Module Configuration. PCSD Batch Shells.	0	4		
6. Phase Classes configuration.	0	4		
7. Phase control and testing.	0	4		
8. Analysis of typicals.	0	4		
9. Control macros for typicals.	0	4		
10. Graphic macros for typicals.	0	4		
11. Logics implementation.	0	4		
12. Graphic implementation.	0	4		
13. Project review and internal tests.	0	4		
14. FAT test procedure simulation.	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. OVREF1160-Analog IO Module Reference Manual
6. Digital IO Module Reference Manual

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 Distributed Control System (DCS) industry, guaranteeing that students gain the competencies necessary for professional certification and fulfill industry criteria. This design provides students with an education that is both theoretically comprehensive and practically applicable, equipping them with the abilities required to excel in a professional environment. The course offers an in-depth exploration of DCS operations, design, and optimization, ensuring that students are thoroughly prepared for certification processes that are widely recognized within the industry.

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 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