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	52.00

2. Course information

2.1 Course title					**Innovation and Emerging 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	4	2.5 Semester	1	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	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	15
(b) Additional documentation in library, specialized electronic platforms, and fieldwork	0	15
(c) Preparation of seminars/laboratories, assignments, papers, portfolios and essays	0	30
(d) Tutoring	0	1
(e) Examinations	0	3
(f) Other activities:	0	5
3.4 Total individual study hours (sum (3.3(a)... 3.3(f)))	0	69
3.5 Total hours per semester (3.2+3.4)	0	125
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, Creating Solutions with Integrated Technologies
4.2 Competency Prerequisites	• General knowledge of Ovation and DeltaV DCS. • Good knowledge of Equipment Module and Phases configuration

5. Conditions (where applicable)

5.1. Course Organization Conditions	NA
5.2. Seminar / Laboratory / Project organization conditions	• Computers, 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 key project lifecycle stages, roles and responsibilities. • Configure complex phases and equipment modules within the DeltaV system. • Understand of Batch Processing Fundamentals
Skills:	• Implement project lifecycle using Ovation/DeltaV DCS
Responsibility and autonomy:	• Take responsibility to implement simple projects using Ovation/DeltaV DCS without supervision.

8. Course Objectives

8.1 General objective of the course	• This course provides definition and configuration key aspects of DeltaV batch processes, including physical models, unit modules, phase classes, and synchronization mechanisms. This objective aims to ensure learners can set up and optimize projects effectively, with a specialized focus on DeltaV and Ovation.
8.2 Specific objectives	• Configure the Physical Model, Unit Classes, Unit Modules • Configure Phase Classes. • Configure Batch Operations, Unit Procedures, Defer Batch Input Parameters to the Operation, Procedures • 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.
NA	NA		NA	NA
Bibliography				
9.2 Seminar / laboratory / project	Hours HEI	Hours CO	Teaching methods	Obs.

1. Batch Process Overview. Defining the DeltaV Batch Process. Batch Licensing & System Preferences	0	4	Presentation of examples, description of software programming environments, additional explanations, exercises, discussions	
2. Configuring the Physical Model. Unit Classes. Unit Modules	0	4		
3. Configuring Phase Classes. Create Phase Run Logic	0	4		
4. Configuring Phase Classes. Hold, Restart Logic and Failure_Monitor. Phase Synchronization	0	4		
5. Batch Executive. Batch Operations. Recipe Parameters & Formulas	0	4		
6. Operations and Unit Procedures. Deferring Batch Input Parameters to the Operation	0	4		
7. Procedures. Equipment Trains. Procedure with Equipment Trains. Dynamic Reference	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. OVMAN91-Graphics Language Reference Manual
2. OVREF1100-Algorithms Reference Manual
3. OVREF1160-Analog IO Module Reference Manual
4. Digital IO Module Reference Manual
5. PCSD Books Online-DeltaV
6. 7016-DeltaV Systems Batch Implementation

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 content is aligned with DCS industry standards and guidelines, ensuring that students acquire skills relevant for professional certification and meet industry benchmarks. This alignment ensures that students receive education that is not only theoretically robust but also practically relevant, equipping them with the skills needed to thrive in a professional setting. By adhering to these standards, the course facilitates a comprehensive understanding of DCS operations, design, and optimization, allowing students to be well-prepared for professional certification processes that are recognized across 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 and commands	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