

Syllabus

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Automation and Computer Science
1.3 Departament	Automation
1.4 Field of study	Systems Engineering
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Automation and Applied Informatics (English)
1.7 Form of education	Full time

2. Data about the subject

2.1 Subject name	Industrial Informatics			Discipline code	40.00
2.2 Course responsible/lecturer	Prof.dr.ing. Honoriu VĂLEAN – Honoriu.Valean@aut.utcluj.ro				
2.3 Teachers in charge of applications	Conf.dr.ing. Dan GOȚA – Dan.Gota@aut.utcluj.ro				
	As.dr.ing. Claudiu DOMUTA – Claudiu.Domuta@aut.utcluj.ro				
	As.drd.ing. Alexandru CIOBOTARU – Alexandru.Ciobotaru@aut.utcluj.ro				
2.4 Year of study	3	2.5 Semester	2	2.6 Assessment (E/C/V)	E
2.7 Type of subject	DF – fundamental, DS – specialty, DC – complementary				DS
	DOB – compulsory, DOP – elective, DFA – optional				DOB

3. Estimated total time

3.1 Number of hours per week	5	of which:	3.2 Course	2	3.3 Seminar		3.3 Laboratory	2	3.3 Project	1
3.4 Number of hours per semester	70	of which:	3.5 Course	28	3.6 Seminar		3.6 Laboratory	28	3.6 Project	14
3.7 Individual study										
(a) Manual, lecture material and notes, bibliography										2
(b) Supplementary study in the library, online and in the field										1
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										1
(d) Tutoring										1
(e) Exams and tests										
(f) Other activities:										
3.8 Total hours of individual study (sum of (3.3(a))...3.3(f)))				69						
3.9 Total hours per semester (3.2+3.4)				125						
3.10 Number of credit points				5						

4. Pre-requisites (where appropriate)

4.1 Curriculum	Computer programming, Applied Informatics, Algorithms Design, Software Engineering, Databases
4.2 Competence	Operating with fundamental concepts in computer science, information and communications technology

5. Requirements (where appropriate)

5.1. For the course	
5.2. For the applications	

6. Specific competences

Professional competences	C2 Operating with basic concepts of computer science, information technology and communication C5 Application development and implementation of automatic control algorithms and structures, using project management principles, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems
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Cross competences	CT3 Identifying the continuing education opportunities and effectively using learning resources and techniques for one's own development
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7. Expected learning outcomes

Knowledge	The student/graduate identifies and describes basic concepts, principles and methods in mathematics, physics, chemistry, technical drawing, economics and computer science; explains and interprets theoretical and experimental results in mathematics, physics, chemistry, economics, technical drawing and computer science; operates with fundamental concepts and methods in the field of communications; designs, implements, tests, uses and knows how to ensure the maintenance of systems with general and dedicated equipment, including computer networks or IoT, for automation and applied computer science applications; develops applications and implements automatic control algorithms and structures, using project management principles, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems; develops control applications for robots and mobile robots, including using artificial intelligence techniques;
Skills	The student/graduate operates with basic concepts, principles and methods from mathematics, physics, chemistry, technical drawing, economics and computer science
Responsibilities and autonomy	The student/graduate applies the values of ethics and deontology of the engineering profession; practices logical reasoning, evaluation and self-assessment in decision-making. The student/graduate communicates effectively about engineering activities with a wide range of audiences; is engaged in lifelong learning to acquire and implement knowledge, as needed, using appropriate learning strategies; works effectively as a team member or team leader; carries out processes in the management of systems engineering projects, taking on different roles in the team and describing clearly and concisely, verbally and in writing, the results; shows a spirit of initiative and action to update professional, economic and organizational culture knowledge;

8. Course objectives

General objective	The ability to design and develop large applications in any technology. Case .Net
Specific objectives	Familiarity with .Net technology Design applications using modern architecture: Tier Architecture, Clean Architecture Design and implement large applications (multi-tier) Design and implement MVC, Angular applications Forming an engineering mindset oriented towards quality, maintainability and separation of responsibilities.

9. Contents

9.1 Lecture	No.hours	Teaching methods	Notes
Introduction in C#	2	Teaching using laptop and projector, interactive course, debate	
The basics of object-oriented programming (OOP) and the application of the four fundamental principles.	2		
Development of console and desktop applications using .NET technologies	2		
Delegates and events	2		
Threading, Synchronization and Task Parallel Library (TPL) in C# and .NET	2		
Integrating applications with DB first and Code first databases	2		
Implementarea și consumarea serviciilor web de tip SOAP și REST	2		
Implementing and consuming SOAP and REST web services	2		
Designing applications using modern architecture: Clean Architecture	2		
Presentation and application of SOLID principles in developing scalable and maintainable applications – part 1	2		
Presentation and application of SOLID principles in developing scalable and maintainable applications – part 2	2		

Design patterns	2		
Understanding and implementing the most used Design Patterns.	2		
MVC Architecture - ASP.NET	2		
Bibliography 1. H. Valean. Industrial Informatics. http://users.utcluj.ro/~valean/industrial_informatics.html 2. D. Bordenca, H. Valean. Industrial Informatics. U.T. Press, 2012, 70 pag., ISBN 978-973-662-735- 3. Sz. Enyedi, I. Lengyel, L. Miclea, I. Stefan, O. Stan, H. Valean. Dezvoltarea si testarea aplicatiilor software. Ed. Risoprint, 2014. 4. A. Troelsen, P. Japikse. C# 6.0 and the .NET 4.6 Framework. APRESS, 2015. 5. W. De Kort. Exam Ref 70-483: Programming in C#. O'Reilly Media, 2013. 6. B. De Smet. C# 4.0 Unleashed. Pearson Education, 2011. 7. I. Spaanjaars. Beginning ASP.NET 4.5.1.in C# and VB. John Wiley & Sons, 2014			
9.2 Applications (seminar/laboratory/project/practical work)	No.hours	Teaching methods	Notes
Object-oriented programming in C#	2	Presentation of examples, demonstrations, discussions, practical applications / or online on Teams platform	Mandatory attendance
Implementation of console applications.	2		
Windows forms. Basic elements. Multiple controls	2		
Desktop applications. Using current frameworks (WPF, WinUI, MAUI)	2		
Design, implementation and testing of multithreaded applications	2		
Databases. SQL server	2		
Databases. EntityFramework	2		
Design, implementation and testing of SOAP web services	2		
Design, implementation and testing of Restful web services	2		
Design, implementation and testing of MVC applications	2		
Design, implementation and testing of ASP.NET applications	2		
MVC in ASP.NET	2		
Design, implementation and testing of Angular applications	2		
Laboratory Assessment	2		
Bibliography 1. H. Valean. Industrial Informatics. http://users.utcluj.ro/~valean/industrial_informatics.html 2. D. Bordenca, H. Valean. Industrial Informatics. U.T. Press, 2012, 70 pag., ISBN 978-973-662-735- 3. Sz. Enyedi, I. Lengyel, L. Miclea, I. Stefan, O. Stan, H. Valean. Dezvoltarea si testarea aplicatiilor software. Ed. Risoprint, 2014. 4. A. Troelsen, P. Japikse. C# 6.0 and the .NET 4.6 Framework. APRESS, 2015. 5. W. De Kort. Exam Ref 70-483: Programming in C#. O'Reilly Media, 2013. 6. B. De Smet. C# 4.0 Unleashed. Pearson Education, 2011. 7. I. Spaanjaars. Beginning ASP.NET 4.5.1.in C# and VB. John Wiley & Sons, 2014			

10. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The content of the discipline, together with the skills and abilities acquired, correspond to the expectations of the professional organizations of profile, the companies of profile, as well as of the national and international bodies of quality assurance (ARACIS). It also ensures the adoption of ethical standards appropriate to the engineering practice

11. Evaluation

Activity type	11.1 Assessment criteria	1.2 Assessment methods	11.3 Weight in the final grade
11.4 Course	Assessment of knowledge through a test based on the knowledge gained following participation in the course	Written exam / online exam using Teams	60%
11.5 seminar/ laboratory/ project/ practical work	Examination of the skills and knowledge acquired through participation in the laboratory. Project presentation	Practical assessment / online assesment using Teams	40%
11.6 Minimum performance standard			

Written exam rank > 5 and practical assessment rank > 5 and project presentation rank > 5

Date of filling in:		Title Firstname NAME	Signature
10.07.2026	Course	Prof.dr.ing. Honoriu VĂLEAN	
	Aplications	Conf.dr.ing. Dan GOȚA	
		SL.dr.ing. Claudiu DOMUȚA	
		As.drd.ing. Alexandru CIOBOTARU	

Date of approval by the Department Board

Head of Departament
Prof.dr.ing. Honoriu VĂLEAN

Date of approval by the Faculty Council

Dean
Prof.dr.ing. Vlad MUREȘAN