SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		Linear algebra, analytical and differential geometry					
2.2 Holder of the subject		Lecturer Fechete Dorina, PhD					
2.3 Holder of the academic seminar/laboratory/project		Lecturer Tripe Adela, PhD					
2.4 Year of study	1	2.5 Semester	1	2.6 Type of the evaluation	Ex	2.7 Subject regime	Fundamental Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1/-/-
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/-/-
Distribution of time					33 hours
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					7
Tutorials					3
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic seminary/laboratory/project	

6. Specific skills acquired	
Professional skills	*Proper implementation of specific fundamental knowledge of mathematics, physics, chemistry, in the field of electrical engineering*
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general	▪ Identifying notions, describing theories and using specific language ▪ Correct explanation and interpretation of mathematical concepts, using specific

objective of the subject	language ▪ Adequate identification of concepts, methods and techniques of mathematical demonstration ▪ Use of mathematical reasoning in demonstrating mathematical results
7.2 Specific objectives	▪ The student is able to practically apply the acquired theoretical knowledge.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Preliminaries (Sets, relations, functions, algebraic structures, matrices, determinants, linear systems)	lecture	2
2. Vector spaces. Properties and examples	lecture	2
3. Basis and dimension of a vector space	lecture	2
4. Change of basis of a vector space	lecture	2
5. Subspaces	lecture	2
6. Linear functions. Definitions and properties	lecture	2
7. The matrix associated with a linear function	lecture	2
8. Eigenvectors and eigenvalues.	lecture	2
9. Scalar products, norms and metrics	lecture	2
10. Bilinear and quadratic forms	lecture	2
11. The vector space of the Euclidean vectors	lecture	2
12. The plane and the line	lecture	2
13. Conic sections and quadric surfaces	lecture	2
14. Curves and surfaces	lecture	2

Bibliography

1. I. Fechete, D. Fechete, *Algebră Liniară. Teorie şi probleme*, Ed. Univ. Oradea, 2010
2. Gh. Ivan, Bazele algebrei liniare si aplicatii, Ed. Mirton, Timisoara, 1996
3. C. I. Radu, Algebra liniara, geometrie analitica si diferentiala, Ed. ALL, Bucuresti, 1996
4. M. Rosculet, *Algebra liniara, geometrie analitica si diferentiala*, Ed. Tehnica, 1987
5. Gh. Sabac, *Matematici speciale*, E.D.P., Bucuresti, 1981

8.2 Seminar	Teaching methods	No. of hours/ Observations
1. Preliminaries (Sets, relations, functions, algebraic structures, matrices, determinants, linear systems)	Exercise	1
2. Vector spaces. Properties and examples	Exercise	1
3. Basis and dimension of a vector space	Exercise	1
4. Change of basis of a vector space	Exercise	1
5. Subspaces	Exercise	1
6. Linear functions. Definitions and properties	Exercise	1
7. The matrix associated with a linear function	Exercise	1
8. Eigenvectors and eigenvalues.	Exercise	1
9. Scalar products, norms and metrics	Exercise	1
10. Bilinear and quadratic forms	Exercise	1
11. The vector space of the Euclidean vectors	Exercise	1
12. The plane and the line	Exercise	1
13. Conic sections and quadric surfaces	Exercise	1
14. Curves and surfaces	Exercise	1

Bibliography

1. I. Fechete, D. Fechete, *Algebră Liniară. Teorie şi probleme*, Ed. Univ. Oradea, 2010
2. C. I. Radu, *Algebra liniara, geometrie analitica si diferentiala*, Ed. ALL, Bucuresti, 1996
3. M. Rosculet, *Algebra liniara, geometrie analitica si diferentiala*, Ed. Tehnica, 1987
4. Gh. Sabac, *Matematici speciale*, E.D.P., Bucuresti, 1981
5. S. Chirita, *Probleme de matematici superioare*, Ed. Didactica si Pedagogica, Bucuresti, 1989

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

• Training of specialists able to meet all current requirements of the labor market • Ensuring adequate training for the study of cutting-edge fields of science and technology

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-	Written examination	50 %
10.6 Seminar	-	Written examination	50 %
10.8 Minimum performance standard: -			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		Special mathematics					
2.2 Holder of the subject		Lecturer Fechete Dorina, PhD					
2.3 Holder of the academic seminar/laboratory/project		Lecturer Tripe Adela, PhD					
2.4 Year of study	1	2.5 Semester	1	2.6 Type of the evaluation	Ex	2.7 Subject regime	Fundamental Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1/-/-
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/-/-
Distribution of time					58 hours
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					16
Tutorials					5
Examinations					2
Other activities.					5

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic seminary/laboratory/project	

6. Specific skills acquired	
Professional skills	*Proper implementation of specific fundamental knowledge of mathematics, physics, chemistry, in the field of electrical engineering*
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general	▪ Identifying notions, describing theories and using specific language ▪ Correct explanation and interpretation of mathematical concepts, using specific

objective of the subject	language ▪ Adequate identification of concepts, methods and techniques of mathematical demonstration ▪ Use of mathematical reasoning in demonstrating mathematical results
7.2 Specific objectives	▪ The student is able to practically apply the acquired theoretical knowledge.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. First order differential equations: Generalities;	lecture	2
2. First order differential equations solvable by quadratures;	lecture	2
3. First order linear differential equation;	lecture	2
4. The existence and uniqueness for the Cauchy problem solution;	lecture	2
5. Approximate methods for solving differential equations.	lecture	2
6. Higher order differential equations: Generalities;	lecture	2
7. Higher order linear differential equations with variable coefficients	lecture	2
8. Higher order linear differential equations with constant coefficients	lecture	2
9. Systems of differential equations	lecture	2
10. Vector calculus identities: Gradient, Divergence and Curl	lecture	2
11. Fourier series	lecture	2
12. The complex shape of the Fourier series; Fourier Integrals and Transforms	lecture	2
13. Operational calculus; The Laplace transform	lecture	2
14. Applications of operational calculus	lecture	2

Bibliography

1. C. I. Radu, *Algebra liniara, geometrie analitica si diferentiala*, Ed. ALL, Bucuresti, 1996
2. M. Rosculet, *Algebra liniara, geometrie analitica si diferentiala*, Ed. Tehnica, 1987
3. Gh. Sabac, *Matematici speciale*, E.D.P., Bucuresti, 1981
4. V. Brinzanescu, O. Stanasila, Matematici speciale, Ed. ALL, Bucuresti, 1994
5. S. Gal, S. Scurtu, Matematici speciale, Oradea, 1998
6. Gh. Micula, P. Pavel, Ecuatii diferentiale si integrale prin probleme si exercitii, Ed. Dacia, Cluj-Napoca

8.2 Seminar	Teaching methods	No. of hours/ Observations
1. First order differential equations: Generalities;	Exercise	1
2. First order differential equations solvable by quadratures;	Exercise	1
3. First order linear differential equation;	Exercise	1
4. The existence and uniqueness for the Cauchy problem solution;	Exercise	1
5. Approximate methods for solving differential equations.	Exercise	1
6. Higher order differential equations: Generalities;	Exercise	1
7. n differential linear differential equation with variable coefficients;	Exercise	1
8. n-order linear differential equation with constant coefficients.	Exercise	1
9. Systems of differential equations	Exercise	1
10. Vector calculus identities: Gradient, Divergence and Curl	Exercise	1
11. Fourier series	Exercise	1
12. The complex shape of the Fourier series; Fourier Integrals and Transforms	Exercise	1
13. Operational calculus; The Laplace transform	Exercise	1
14. Applications of operational calculus	Exercise	1

Bibliography

7. C. I. Radu, *Algebra liniara, geometrie analitica si diferentiala*, Ed. ALL, Bucuresti, 1996
8. M. Rosculet, *Algebra liniara, geometrie analitica si diferentiala*, Ed. Tehnica, 1987
9. Gh. Sabac, *Matematici speciale*, E.D.P., Bucuresti, 1981
10. V. Brinzanescu, O. Stanasila, Matematici speciale, Ed. ALL, Bucuresti, 1994
11. S. Gal, S. Scurtu, Matematici speciale, Oradea, 1998
12. Gh. Micula, P. Pavel, Ecuatii diferentiale si integrale prin probleme si exercitii, Ed. Dacia, Cluj-Napoca

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- Training of specialists able to meet all current requirements of the labor market
- Ensuring adequate training for the study of cutting-edge fields of science and technology

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-	Written examination	50 %
10.6 Seminar	-	Written examination	50 %
10.8 Minimum performance standard: -			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
1.4 Field of study	Systems engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Applied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**ANALYSIS AND SYNTHESIS OF NUMERICAL DEVICES**				
2.2 Holder of the subject			Prof. GERDA ERICA MANG				
2.3 Holder of the academic seminar/laboratory/project			Assoc. prof. KOVENDI ZOLTAN				
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	VP	2.7 Subject regime	DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 seminar/laborator/pr	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 seminar/laborator/pr	0/14/0

Distribution of time	33
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	9
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector - Attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	Room equipped with computers and specific programs - Mandatory attendance at all laboratories; - A maximum of 3 works can be recovered during the semester (20%);

6. Specific skills acquired	
Professional skills	**C2. Working with fundamental concepts of computer science, information technology and communications**
Transversal skills	**CT2. Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working**

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Introduction to Boolean algebra ▪ Initiation in the analysis and synthesis of the main categories of combinational circuits. initiation into the theory and practice of logic devices and circuits; • acquiring the practical skills necessary for the analysis of logical schemes, of the logical design of some combinational circuits that are the basis of the complex architectures of the computer systems;
7.2 Specific objectives	• using the computer in order to design the circuits, to verify from a functional point of view the designed scheme

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 1. Boolean algebra. Its application to the study of switching circuits. Definition of Boolean algebra. Inverter circuit. The transfer function of a switching circuit. Operations with functions. Normal disjunctive expression. Normal conjunctive expression. Complete operating systems. Modes of representation. Dual expressions. Classes of Boolean functions. Autodual functions	• Powerpoint presentation; • • free discussions;	2
CHAPTER 2 Minimizing switching functions. The method of minimization using the axioms and theorems of Boolean algebra. Minimization diagram method. Minimum disjunctive form. Minimum conjunctive form. Using the diagram method to minimize incompletely defined switching functions. Minimize functions with more than four variables. Condensation of minimization diagrams. Quine - Mc Cluskey method Minimization of Boolean function systems	• Powerpoint presentation; free discussions;	3

CHAPTER 3. Analysis of combinational circuits with gates or logic elements. Synthesis of combinational circuits with gates or logic elements. Analysis of logic networks with NAND or NOR circuits. Synthesis of networks with logical elements. Synthesis of two-level networks. Synthesis of two-tier networks with NAND elements. Synthesis of circuits with NOR elements.	• Powerpoint presentation; free discussions	2
CHAPTER 4. Examples of combinational logic circuits. The summation circuit for a rank. Adder for several ranks. Selector circuit (multiplexer). Distributor circuit (demultiplexer). Code converter. The decoder. The encoder. Numerical comparators. Parity detector and generator. Programmable logic areas. Minimizing programmable logic areas	• Powerpoint presentation; free discussions	3
CHAPTER 5. Sequential circuits. Elementary sequential circuits. Synchronous RS type CBB. Synthesis of the tilting circuit D with synchronous RS. J-K flip-flop circuit. J-K flip-flop circuit "MASTER - SLAVE". Synthesis of sequential circuits	• Powerpoint presentation; free discussions	2
CHAPTER 6. Counters. Asynchronous counter module 2n. Asynchronous counter modulus $M \neq 2^n$. Synchronous counters. Synchronous binary decimal counter. Reversible counter. Counter without asynchronous inputs	• Powerpoint presentation; free discussions;	2

Bibliography

1. Mang Gerda Erica, Analiza şi sinteza circuitelor logice – circuite combinaţionale, Editura Universităţii din Oradea, ISBN 973-8219-96-5, 2001
2. Mang Gerda Erica, Analiza şi sinteza circuitelor logice – circuite secvenţiale, Editura Universităţii din Oradea, ISBN 973-8083-72-9, 2000
3. Mang Gerda Erica, Ppt. – slide-uri, 2012
4. Mang Gerda Erica, Ppt. – slide-uri, 2010
5. John M. Yarbrough, Digital Logic – Applications and Design, West Publishing Company, 1997

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Seminary		
Laboratory		
Introducing the Xilinx program. Making a device for choosing the optimal path.	Tests. Discussions. Individually work and also in small groups of students	1
One-bit adder.	Tests. Discussions. Individually work and also in small groups of students	1
8-bit adder.	Tests. Discussions. Individually work and also in small groups of students	1
7-segment decoder.	Tests. Discussions. Individually work and also in small groups of students	1

Multiplexer circuit.	Tests. Discussions. Individually work and also in small groups of students	1
Code converter.	Tests. Discussions. Individually work and also in small groups of students	1
Parity generator	Tests. Discussions. Individually work and also in small groups of students	1
8.4 Project		

Bibliography
Mang E., Mang I., C.Popescu., Proiectarea logica a circuitelor combinationale. Aplicatii, 2010 Editura Universităţii din Oradea, ISBN978-606-10-0328-0, 122pag
Mang Gerda Erica, Analiza si Sinteza circuitelor logice – Circuite combinationale. ISBN: 978-606-10-13478-4, 2014
Mang Gerda Erica, Popescu Constantin, Proiectare logica cu circuite FPGA – partea I, Universitatea din Oradea, 60 pg, 2006, actualizat in format electronic 2012,
Dave Van den Bout, Practical Xilinx Designer Lab Book, Prentice Hall, 1997
Xilinx, Lab Projects Documentation, Foundation Series Express, Documentatie Xilinx, 2018

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is adapted to the requirements of specialized companies

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For 10: the correct solving of all the subjects at the exam, the presence and activity at courses	Final course evaluation and problem solving	60%
10.5 Seminary			
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10: the presence and activity at seminars,	Weekly evaluation of the laboratory preparation Tracking the activity along the way, practical applications.	20%
10.7 Project			
10.8 Minimum performance standard:			

- Carrying out projects respecting ethical and responsible behavior;
- Knowledge of the design method used
- Design of elementary circuits

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Modern Languages – English (1)**				
2.2 Holder of the subject			**Lecturer PhD. Abrudan Caciora simona Veronica**				
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**I**	2.5 Semester	**1**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**1**	of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum	**14**	Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	36
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	18
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**36**
3.9 Total of hours per semester	**50**
3.10 Number of credits	**2**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of English
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic laboratory/project	- Mandatory presence at 80% of the seminars; - The seminar can be carried out face to face or online -

6. Specific skills acquired

Professional skills	
Transversal skills	**CT3.** Effective use of information sources and resources of communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The seminar aims to be, for the students who do not have English as main subject, a means of improving the English knowledge they had acquired in high school, in order to reach the level of language competence that would alow them to understand and produce accurate academic and scientific texts in English, and understand written or verbal texts on topics related to the field of engineering in general and the specialization they have chosen, in particular. During the seminar, students are given the opportunity to produce written texts or to express themselves verbally, in English. In order to achieve these goals, the textbooks elaborated by the foreign languages team of the Department of Automated Systems Engineering and Management are used, as well as specialized books, published by well-known international publishing houses.
7.2 Specific objectives	• Acquiring field-related vocabulary in English and the completion of documents that are specific to the chosen field of study

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Introductory seminar. Test for the evaluation of students'level of English language skills.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 2. What is Engineering? Reading. Vocabulary and conversation exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 3 The plural of nouns: Revision and application exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 4. Engineers – Education and Specializations. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 5. The degrees of comparison for adjectives and adverbs (revision exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 6: Engineering Design. Technical Drawing in Engineering. Types of Views Used in Engineering Drawing.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 7: Present Tense Simple and Continuous (Revision exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 8: Computer-Aided Design and Drawing. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 9: The Past Tense Simple and The Past Tense Continuous (Revision and exercises).	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 10: Engineering Materials. Types of Materials and The Properties of Materials Used in Engineering. (Listening and vocabulary exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 11: The Present Perfect Tense Simple: The Present Perfect Tense Continuous. (Revision and exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 12: Processes Applied to Engineering Materials. Forming Materials into Shapes. (Reading and conversation exrcises**)**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 13: The Past Perfect Tense Simple and Continuous (Revision and exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 14: Basic Concepts Related to Electrical Engineering: the Electric Field, the Magnetic Field, Electrostatics, Electrokinetics.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering,* Editura Universităţii "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, Benţea Violeta, *A Practical Course In English Science and Technology* , Editura Universitatii din Oradea, Oradea 2002
Beakdwood, L, *A first Course in Technical English*, Heinemann, 1978
Fitzgerald, Patrick,ș Marie McCullagh and Carol Tabor, *English for ICT Studies in Higher Education Studies*, Garnet Education, Reading, UK, 2011.
PPP- English for Science and Technology,Cavaliotti,Bucuresti, 1999

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of Technical Engish requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %

	subjects, without presenting details on them For 10: thorough knowledge of all subjects is required		

10.6 Minimum performance standard:
Seminary:
Capacity to use English in an appropriate way, depending on the context
Capacity to produce any of the documents, written in English, presented and discussed during the seminaries
Capacity to use grammatical structures accurately

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electrical Engineering**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Modern Languages – English (1I)**				
2.2 Holder of the subject			**Lecturer PhD. Abrudan Caciora simona Veronica**				
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**I**	2.5 Semester	**1I**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**1**	of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum	**28**	Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**36**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	22
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	11
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**36**
3.9 Total of hours per semester	**50**
3.10 Number of credits	**2**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of English
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic laboratory/project	- Mandatory presence at 80% of the seminars; - The seminar can be carried out face to face or online

6. Specific skills acquired

Professional skills	
Transversal skills	**CT3.** Effective use of information sources and resources of communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The seminar aims to be, for the students who do not have English as main subject, a means of improving the English knowledge they had acquired in high school, in order to reach the level of language competence that would alow them to understand and produce accurate academic and scientific texts in English, and understand written or verbal texts on topics related to the field of engineering in general and the specialization they have chosen, in particular. During the seminar, students are given the opportunity to produce written texts or to express themselves verbally, in English. In order to achieve these goals, the textbooks elaborated by the foreign languages team of the Department of Automated Systems Engineering and Management are used, as well as specialized books, published by well-known international publishing houses.
7.2 Specific objectives	• Acquiring field-related vocabulary in English and the completion of documents that are specific to the chosen field of study

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Material types: Metals and non-metals. Elements, compounds and mixtures. Composite materials. Vocabulary and speaking exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter Polymers. Natural and synthetic polymers. Thermoplastics and thermosetting plastics. Reading. Vocabulary and conversation exercises. Revision of numerals.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 3: **Material properties (I). Tensile strength and deformation. Elasticity and plasticity. Stages in elastic and plastic deformation**.Vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 4. Material properties (I). Hardness. Fatigue, fracture toughness and creep. Basic thermal properties. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 5. Interconnection: vocabulary relating to attaching and supporting and fitting together different parts, specific to the engineering domain. (revision exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 6: Mechanical fasteners (I). Bolts. Preload in bolted joints. Washers. Listening and speaking exercises. Revision: Countable and uncountable nouns.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 7: Mechanical fasteners (2). Screws. Screw anchors and rivets.. Vocabulary and speaking exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 8: Non-mechanical joints: welding, brazing, soldering, adhesives. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 9: Referring to types of force and deformation. The concept of failure in engineering Vocabulary and speaking exercises	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 10: Expressing numbers and calculations. Decimals and fractions. Addition, subtraction, multiplication and division. (Listening and vocabulary exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 11: Referring to the electrical supply. Direct current and alternating current. AC generation and supply. DC generation and use.. (Reading and exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 12: Referring to circuits and components. Simple circuits. Mains AC circuits and switchboards. Printed and integrated circuits. Electrica land electronic components. (Reading and conversation exrcises**)**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 13: Referring to engines and motors. Types and functions of engines and motors. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 14: Referring to energy and temperature. Forms of energy. Energy efficiency. Work and power.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering,* Editura Universităţii "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, Benţea Violeta, *A Practical Course In English Science and Technology* , Editura Universitatii din Oradea, Oradea 2002
Beakdwood, L, *A first Course in Technical English*, Heinemann, 1978
Fitzgerald, Patrick,ș Marie McCullagh and Carol Tabor, *English for ICT Studies in Higher Education Studies*, Garnet Education, Reading, UK, 2011.
PPP- English for Science and Technology,Cavaliotti,Bucuresti, 1999

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of Technical Engish requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the	Written exam Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %

	subjects, without presenting details on them For 10: thorough knowledge of all subjects is required		

10.6 Minimum performance standard:
Seminary:
Capacity to use English in an appropriate way, depending on the context
Capacity to produce any of the documents, written in English, presented and discussed during the seminaries
Capacity to use grammatical structures accurately

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject		**Mechanics**					
2.2 Holder of the subject		**Conf. PhD eng. Tiberiu Barabas**					
2.3 Holder of the academic laboratory/project		**Conf. PhD eng. Tiberiu Barabas**					
2.4 Year of study	**I**	2.5 Semester	**1**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1/-**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academiclaboratory/project	**14/-**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	16
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**62**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering.
Transversal skills	**CT1.** Application, in the context of legislative compliance, of intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of professional ethics code in their own strategies for rigorous, efficient and accountable work. **CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Study and knowledge of basic elements of mechanical engineering: kinematics and dynamics of rigid solid, calculation of configuration and kinematics of some mechanisms. • Forming the technical horizon of the future specialist.
7.2 Specific objectives	• The course aims in particular at providing knowledge and methods of study for the balance and movement of material bodies; such knowledge being necessary for students who are preparing in the field of Automation and applied informatics to understand, and then to be able to design new automation installations from the point of view of their organs, of the parts in balance under the action of some types of moving forces. • The laboratory offers the skill of engineering methods to approach and solve problems related to the calculation of mechanical elements.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Cap1. Introductions. Cap2. Statics of the material point. Cap3. Statics of the rigid solid. Cap4. Kinematics of the material point. Cap5. Theorems and general methods in dynamics. Cap6. Structure of a mechanical system.	Free exposure, with the presentation of the course with video projector, on the board or online	2h 4h 6h 6h 6h 4h

Bibliography

1. Cornel Marin, Teodor Huidu, **Mecanică**, Editura Printech, Bucureşti, 1999.
2. Dumitru Luca, Cristina Stan, **Mecanică clasică**, Universitatea Al. I. Cuza Iaşi, 2007
3. Florescu Daniela, **Curs de mecanică tehnică**, Editura Alma mater, Bacău, 2007
4. Octavian G. Mustafa, **Elemente de mecanica punctului material şi a solidului rigid**, Universitatea din Craiova, 2002
5. Tudose, Sandu-Ville, Fl., Racocea, C., Farcas, Fl., Hanganu, L., **Organe de maşini şi inginerie mecanică** - aplicatii, Editura Gh. Asachi Iasi, 2003
6. Vlase Sorin., **Mecanica. Statica**. Ed. Infomarket, Braşov, 2008
7. Vlase Sorin., **Mecanica. Cinematica**. Ed. Infomarket, Braşov, 2007
8. Vlase Sorin., **Mecanica. Dinamica**. Ed. Infomarket, Braşov, 2005

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory and of the labor protection norms. 2. Statics of the material point. Vector operations – computer	Students receive laboratory papers at least one week in advance, study them, inspect	2 h 2 h

application. 3. Reduction of competing coplaning forces - computer application. 4. Reduction of competing spatial forces - computer application. 5. Reduction of parallel force systems - computer application. 6. Reduction of force and moment systems - computer application. 7.Closing the situation at the laboratory.	them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h

Bibliography

1. Teodor Huidu, Cornel Marin, **Probleme rezolvate de mecanică**, Editura Macarie, Târgovişte , 2001
2. Tiberiu Barabas, **Fascicule pentru lucrări de laborator**, Universitatea din Oradea.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- There is strong collaboration with the economic environment in the region (Celesitica, Comau, GMAB, etc.), focused on issues and topics of interest to them.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	70 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	30%

10.6 Minimum performance standard:

- Knowledge of the basic elements in the kinematic and dynamic calculation of some components in the structure of mechanical systems.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Operating systems in automation**				
2.2 Holder of the subject			**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**				
2.3 Holder of the academic laboratory/project			**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**				
2.4 Year of study	**I**	2.5 Semester	**2**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**DS**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic laboratory	**14**

Distribution of time	58
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of computer using, informatics, programming
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	**C2.** Operation with fundamental concepts of computer science, information and communications technology
Transversal skills	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working **TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Reasoned using of the concepts of informatics and computer technology for solving well-defined problems in systems engineering field and in applications based on hardware and software using, in industrial systems or informatic systems.
7.2 Specific objectives	• Using of integrated hardware-software design (co-design) and of programming engineering as development methodologies, including the modelling at system level.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction in operating systems 1.1. Generalities 1.2. Classification of the operating systems 1.3. The evolution of the operating systems 1.4. Modern operating systems	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
2. UNIX operating system. Case study 2.1. Introduction 2.2. Short history 2.3. UNIX architecture 2.4. UNIX functionalities 2.5. UNIX implementations. Linux Fedora Project. Live CD 2.6. Commands and graphical interfaces in UNIX 2.7. UNIX documenting	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
3. UNIX files system. Case studies 3.1. Generalities 3.2. Partitions and swap space 3.3. Linux-Fedora installation. Boot Menu, editing Fedora Boot Menu 3.4. Files types 3.5. Primary commands for files and directories 3.6. Special characters in UNIX	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
4. Files and directories administration. Case studies 4.1. Introduction 4.2. Command line and basic commands 4.3. Commands for harddisks and partitions	Free exposure, with the presentation of the course with video projector,	4 h

4.4. Searching files on the disk and strings in files 4.5. Files sorting 4.6. Archiving and compressing files.	on the board or online	
5. Text editors. Case studies 5.1. Introduction 5.2. vi editor 5.3. pico editor	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
6. Processes. Case studies 6.1. Generalities 6.2. UNIX tools for processes visualization 6.3. Running processes in background. Jobs and daemons 6.4. Signals 6.5. Important processes	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
7. UNIX shells. Case studies 7.1. Definition and functions 7.2. Variants of shell 7.3. Short history 7.4. Shells for Linux 7.5. System initialisation and login programm 7.6. Writing a shell-script	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
8. Configurations and network services 8.1. Generalities 8.2. ARPA services 8.3. Integration with other operating systems	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
9. Security 9.1. Generalities 9.2. System security 9.3. Network security	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
10. Graphical environment. Case studies 10.1. Generalities 10.2. Graphical interface in Linux 10.3. Starting and stoping the graphical interface 10.4. Server X configuration	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
Total		**28 h**

Bibliography

1. Spoială Dragoş-Cristian , **Sisteme de operare,** Electronic format course for students, 2018
2. Rughiniș R., Deaconescu R., Milescu G., Bardac M., **Introducere în sisteme de operare**, Editura Printech
3. D. Acostăchioaie, **Administrarea şi Configurarea Sistemelor Linux**, ediţia a 3-a, Editura Polirom, 2005
4. D. Acostăchioaie,Sabin Buraga, **Utilizare Linux. Noţiuni de bază şi practică**, Editura Polirom, 2004
5. T. Ionescu, Daniela Saru, J. Floroiu, **Sisteme de operare. Principii şi funcţionare**, Editura Tehnică, Bucureşti, 1997
6. Pălivan, H. Pălivan, **Linux pentru avansaţi**, Editura Tehnică, Bucureşti, 2001
7. A. Tanenbaum, **Sisteme de operare moderne**, ediţia 2-a, Ed. Biblos, Bucureşti, 2004

8. UNIX – Tutorial - Internet 9. *** "Operating Systems", Wikipedia, http://en.wikipedia.org/wiki/Operating_system 10. *** http://fedoraproject.ro/ 11. *** http://mirrors.fedoraproject.org/publiclist/		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Linux-Fedora installation **2.** Linux-Fedora – introductory aspects – first commands **3.** System variables – input/output operations – network applications **4.** Text editors – Processes – Files and directories **5.** Creating users and groups. Rights concerning the files and directories **6.** Shell programming. Shell scripts **7.** Server configuration in Linux **8.** Recoveries and closing the situation at the laboratory	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a random test during the laboratory. The students carry out the practical part of the work under the guidance of the teacher	1 h 2 h 2 h 2 h 2 h 2 h 2 h 1 h
Total		**14 h**
Bibliography 1. Dragoș Cristian Spoială, Alina-Diana Pavel, *Sisteme de operare*, îndrumător de laborator, ediție CD-ROM, ISBN 978-606-10-1677-8, 2015		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics study program from other university centers that have accredited this specialization (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Bucharest, Gh. Asachi University of Iasi, etc.). The working principles with Linux-Unix operating system are very important for the graduated students in their employment in the field of automation (Nidec, Comau, Plexus, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (grade 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written and oral verification during the semester** There are 2 verifications during the semester. The subjects are divided in 2 parts. For each of them the verification consists of a quiz with questions of theory and computer applications from all the courses. The final grade is calculated as the mean of the 2 grades obtained from the both verifications.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum	**Practical application** Each student receives a grade for laboratory work during the semester	40%

	performance standard students have to carry out the laboratory works, without presenting details on them For 10: complete performing of all laboratory works	and for the laboratory work file. This results in an average for the laboratory.	
10.6 Minimum performance standard: **Course**: usage of the concepts and instruments from the computer science and information and communications technology field, in order to solve specific problems for system engineering. **Laboratory:** completion of the content of all laboratory works; participation to all the laboratory works.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control Systems Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Industrial electrotehnics**					
2.2 Holder of the subject		**Prof.Dr.-Ing.Ec. Silaghi Alexandru Marius**					
2.3 Holder of the academic seminar/laboratory/project		**Ş.l.Dr.Ing. Pantea Mircea Dănuț**					
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**

Distribution of time	33h
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	2
Examinations	3
Other activities.	

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of mathematics and physics
4.2 related to skills	PC usage, Electrotehnics

5. Conditions (where applicable)

5.1. for the development of the course	- attending at least 50% of the course - the course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	- mandatory presence at all laboratory and seminar hours; - students will perform the hours with the lab work; - maximum 2 works (30%) can be recovered during the semester; - frequency at laboratory less than 70% leads to the restoration of discipline. - the laboratory can be carried out face to face or online.

6. Specific skills acquired

Professional skills	C1.Application of the fundamental knowledge of mathematics, physics, chemistry, specific in the field of electrical engineering.
Transversal skills	CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The course "Industrial Electrotechnics" proposes a familiarization of students in the field of Automatics and Applied Informatics with some knowledge in theoretical electrical engineering and electrical machines, its objective being to present different calculation methods necessary to solve problems in industrial electrical engineering, classical or modern, and the laboratory works refer to the sizing of some assemblies, the correct use of the measuring devices and to the introduction of some industrial applications.
7.2 Specific objectives	▪ Its objective is to present some calculation methods, in a unitary framework, which are necessary to solve the problems in classical or modern industrial electrical engineering. ▪ Without neglecting the theoretical aspect of the treated problems, a greater emphasis was placed on the practical applications, the course containing calculation examples. ▪ The laboratory part familiarizes students with practical aspects regarding the operation of electrical systems.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. INTRODUCTORY CONSTITUENTS	Free exposure, with the presentation on-line	4 h
Chapter 2. SINGLE-PHASE ELECTRICAL TRANSFORMER	Free exposure, with the presentation on-line	6 h
Chapter 3. PRESENTATION OF DIRECT CURRENT MACHINES	Free exposure, with the presentation on-line	6 h
Chapter 4. PRESENTATION OF AC MACHINES	Free exposure, with the presentation on-line	6 h
Chapter 5. MATERIALS PROCESSING IN ELECTROMAGNETIC FIELD	Free exposure, with the presentation on-line	6 h
Total		28 h

Bibliography

Silaghi,M.,Maghiar,T,Leuca,T.,-Electrotehnică industrială, Editura Universităţii din Oradea, 2002,ISBN 973-613-111-4

Pantea, M.D , Silaghi , A.M. – Electrotehnica, Editura Universităţii din Oradea, 2010, ISBN 978-606-10-0011-1 Silaghi , A.M., Pantea, M.D. - Introducere in Electrotehnica, Editura Risoprint, 2010, ISBN 978-973-53-0258-0 Silaghi , A.M., Pantea, M.D., Silaghi, Helga – Electrotehnica industriala, Editura Universităţii din Oradea, 2010, ISBN 978-606-10-0186-6		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Presentation of the topic and the laboratory. Instructions for work safety technique. Measurement of voltage, current. Resistors in series and parallel.	Students receive lab reports at least one week before, study them, study them, and give a theoretical test at the beginning of the lab. Then, students complete the practical part of the paper under the guidance of the teacher. Free presentation on how to mount the assemblies and check them after the students have finished the assembly.	2 h
2. Superposition and maximum power transfer theorem		2 h
3. Star-delta and triangle-star transfiguration. Detection of errors in direct current circuits		2 h
4. DC motor speed measurement. Reverse electromotive voltage of a DC motor		2 h
5. The load of a DC motor		2 h
6. Speed adjustment, efficiency, torque and power		2 h
7. Program for the recovery of laboratory work and verification of the acquired concepts		2 h
Total		14 h
Bibliography Hantila,I.,F.,...,Silaghi,M.,Leuca,T.-Elemente de circuit cu efect de camp electromagnetic,Editura ICPE,Bucuresti,1998 Maghiar,T.,Leuca,T.,Silaghi,M.,Marcu,D.-Circuite electrice liniare in regim permanent sinusoidal. Îndrumator de laborator Litografiat Universitatea Oradea,1997 Maghiar,T.,T.,Silaghi,Leuca,T.,Pantea,M.,Soproni,D.-Electrotehnică industrială. Îndrumător de laborator, Editura Universităţii din Oradea, 2001, ISBN 973-613-066-5 Pantea, M.D , Silaghi , A.M. - Electrotehnica, Editura Universităţii din Oradea, 2010, ISBN 978-606-10-0011-1 Silaghi,M.,Maghiar,T.,Leuca,T.,-Electrotehnică industrială, Editura Universităţii din Oradea, 2002,ISBN 973-613-111-4 Pantea, M.D , Silaghi , A.M. – Electrotehnica, Editura Universităţii din Oradea, 2010, ISBN 978-606-10-0011-1 Silaghi , A.M., Pantea, M.D. - Introducere in Electrotehnica, Editura Risoprint, 2010, ISBN 978-973-53-0258-0 Silaghi , A.M., Pantea, M.D., Silaghi, Helga – Electrotehnica industriala, Editura Universităţii din Oradea, 2010, ISBN 978-606-10-0186-6		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Automation and Applied Informatics and other university centers in Romania that have accredited these specializations, so knowledge of their basic notions in Electrical Engineering is a stringent requirement of employers in the field (Plexus, Faist Mekatronics, Celestica, Comau, GMAB etc) from the Oradea Industrial Park area.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard 1pt. - ex officio - attendance at the course 4PT. - 4 medium-level subjects - For 10: 1pt. - ex officio - attendance at the course 9PT. - 9 medium-level subjects	Questioner on line with 9 subjects	80%
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10: 1pt. - ex officio - attendance at the laboratory 9PT. - 9 medium-level subjects	Questioner on line with 9 subjects	20%
10.6 **Final exam note:**	**Nfe**=0,8**Nse**+0,2**Nla**, **Nla**>5		
10.7 Minimum performance standard: Course:- knowing the construction parts and the principle of operation of different electrical equipment. - the ability to identify a particular type of electrical circuit - participating in at least half of the courses. Academic seminar: - ability to solve the electromagnetic problems. Laboratory: - ability to conceive and read an electrical scheme - ability to carry out an electrical installation; - participation in all laboratory work.			
E110, tel.:+40 259 408 458 , masilaghi@uoradea.ro, **hhtp://masilaghi.webhost.uoradea.ro**			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics/ Bachelor in engineering**

2. Data related to the subject

2.1 Name of the subject		**Communication**					
2.2 Holder of the subject		**Lecturer Phd. eng. Sanda DALE**					
2.3 Holder of the academic seminar/laboratory/project							
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**1**	of which: 3.2 course	**1**	3.3 academic seminar/laboratory/project	-/-/-
3.4 Total of hours from the curriculum	**14**	Of which: 3.5 course	**14**	3.6 academic seminar/laboratory/project	-/-/-
Distribution of time					11 hours
Study using the manual, course support, bibliography and handwritten notes					1
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					1
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					5
Tutorials					
Examinations					4
Other activities.					
3.7 Total of hours for individual study	**11**				
3.9 Total of hours per semester	**25**				
3.10 Number of credits	**1**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	
6. Specific skills acquired	

Professional skills	**C6.** Apply knowledge of law, economics, marketing, business and quality assurance in the economic and managerial contexts
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline has as an objectiv to support the students from Automatics and Applied Informatics in getting familiar with the knowledge and abilities in professional communication.
7.2 Specific objectives	▪ The course has as a starting point the idea that professional communication abilities must be permanently learned and improved. Hence, the main aim of the course is, for the students, to aquire the communication abilities that are necesary in the professional interactions, team working, projects and presentations. In every aspect, all kind of communication, including the technical ones, are considered.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Obs.
Chapter I: The object of proffesional communication 1.1. The aim of the course. Definitions. 1.2. Communication decaloque	Free exposure, course presentation on video projector, on the board or online	2h
Chapter II . Bussiness communication 2.1. Defining business communication 2.2. Roles and rules in business communication 2.3.Features and functions in business communication		2h
Chapter III. Active listening. The role of feedback in communication Listening and active listening. Factors determining the succes or failure in communication		2h
Chapter IV. Oral communication. **The meeting. Communication techniques in organizations**		2h
Chapter V. Oral communication. Interview as communication form in organizations		2h
Chapter VI. Written communication 6.1. Business letters 6.2. Booklets 6.3. Reports 6.4. Online communication		4h
Bibliography 1. Abrudan Simona Veronica - *Fundamentele comunicării economice*, Editura Universitatii din Sibiu, 2009 2.Bentea Violeta, Abrudan Simona Veronica - *Comunicare profesională***,** (Note de curs), Editura Asociaţiei, Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations

Bibliography 1.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of this discipline can be find in the curriculum of other academic centers accredited for such specialization (Universitatea Tehnică din Cluj-Napoca, Universitatea din Craiova, Universitatea ,,Politehnica"din Timişoara, Universitatea Gh. Asachi Iaşi, etc). Knowing the communication issues in proffesional background is a stringent requirement of the employers in the domain (Comau, Faist Mekatronics, Celestica, GMAB etc).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods Evaluation can be made face-to-face and online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard, without presenting details - For 10: throughout knowledge of all subjects	**Oral presentation** The students make presentations on chosen subjects, in teams formed by 3-4 people	100%
10.5 Academic seminar			
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Course: Finding the proper solution on designating tasks, through individual and team work, with qualified assistance, having in mind the ethical professional norms. Responsible assuming of specific tasks in multi-specialized teams and efficient communication at institutional level. Academic seminar: Laboratory: Project:			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		***Computer Architecture***					
2.2 Holder of the subject		Prof.dr.habil.eng. Daniela Elena Popescu					
2.3 Holder of the academic seminar/laboratory/project		**lect.dr.ing. Mircea-Petru Ursu**					
2.4 Year of study III		2.5 Semester 5		2.6 Type of the evaluation	7) Ex	2.7 Subject regime	8) DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28/ 14
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					28
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**28**
Tutorials					10
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**98**
3.9 Total of hours per semester	**168**
3.10 Number of credits	**6**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper; - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to familiarize students with specialization with as much knowledge: theoretical and practical, related to the structure and operation of computer systems, so that students are able to understand the operation of modern systems, and the parallelism in their implementation.
7.2 Specific objectives	Course: ▪ Understanding arithmetic and logic operations. Classification of summation structures according to the mode of transport propagation ▪ Understanding Input, output, connection topologies. ▪ General information about computer networks, Network topologies, network standards, and network protocols ▪ Parallel computer architectures, Parallelism in systems with a central unit, Parallelism in systems with several central units, Classification of architectures, ▪ Understanding Parallelism in time (pipeline), Parallelism in Space (Processor Areas), Vector processing, ▪ Architectures based on the concept of data flow, Systolic architectures Laboratory & Project: ▪ Fixing the architecture, exterior interface signals, and instruction set for the processor project theme. Realization of the data processing unit at the level of the processor to be designed, Following the execution phase of the instruction for each instruction, Elaboration of the flowchart of the instruction cycle for the whole., Implementation of the control unit and the block of control circuits,, The project provides the necessary knowledge to the students in order to be able to design a minimum calculation system starting from some given specifications.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Central units and arithmetic-logic units, wired control and microprogrammed control. Particularities of information representation in computing systems. How to perform arithmetic and logic operations. Classification of summation structures according to the mode of transport propagation	• Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity • Indication of topics for documentation and individual study	4
Chapter 2. Input, output, connection topologies. Bus communications. Protocols. Arbitrations. Methods of communication with IO devices (Inputs-Outputs, Interrupts, DMA)		4
Chapter 3. General information about computer networks, Network topologies and standards, HDLC		4

protocol. ISO model of OSI architecture. ARPA Internet. Network topologies, standards and protocols		
Chapter 4 Parallel computer architectures, Parallelism in systems with a central unit, Parallelism in systems with several central units, Classification of architectures		2
Chapter 5 Parallelism in time - The concept of pipeline, The organization of memory in structures with pipeline, Central units using pipeline. Arithmetic units with pipeline, Problems of these structures, Computers with BA		4
Chapter 6 Parallelism in Space - Processor Areas (PA). Characterization of PA, Types of Organizations, Associative PAs, Static and Dynamic Interconnection Networks, Problems Considered in PA Design, Multiple Processor Areas, Computers with PAs		2
Chapter 7 Vector processing, The typical structure of a vector computer, The concept of vector processing and assembly tape. Examples of vector processors.		2
Chapter 8 Architectures based on the concept of data flow., Graphical representation of programs, General structure of a system with data flow, Types of architectures with data flow, Static data structures and dynamic data structures, Disadvantages of the concept of data flow. data flow		2
Chapter 9 Systolic architectures, Characteristics of systolic architectures, Types of systolic structures, Tolerance to failures in systolic structures, Computers with systolic architecture. Algorithms / structures ratio		2

Bibliography

- Course notes (slides) made available to students in electronic format on the Office 365 platform, https://uoradea-my.sharepoint.com/personal/daniela_popescu_didactic_uoradea_ro/Documents/Forms/All.aspx
- William Stalings, Computer Organization and Architecture, 9th Edition, March 11, 2012 | ISBN-10: 013293633X | ISBN-13: 978-0132936330, Computer Science Series
- Course notes Architecture systems architecture, D.E.Popescu, posted on the Office platform for CTI students
- Popescu Daniela E .. - Architecture and organization of conventional computer systems ,, University of Oradea Publishing House, Oradea, 2002, ISBN 973-613-225-0, 2002
- D.E.Popescu, C.Popescu, Architecture of computer systems, University Publishing House, laboratory supervisor, ISBN 973-613-225-9, 2002
- Popescu Daniela E., Introduction to the architecture of computer systems, MATRIX ROM publishing house Bucharest, ISBN 973 - 685-067 –6
- K.Hwang, F.A. Briggs - Computer Architecture and Parallel processing, Treira Publishing House, Mc Graw - Hill Book company 1987
- Mircea Popa, Introductions in parallel and unconventional architectures, AS Computer Press Publishing House Timişoara 1992

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms and of the problems specific to the field of computer systems - generalities regarding the architecture of computer systems.	Students receive (via the Internet) the laboratory papers at least one week in advance and study them. Then, the students carry out the practical part of the work under the guidance of the teacher. The tools used are: ALTERA Quartus II Web Edition - integrated environment for the development and simulation of digital circuits ALTERA DE1 - Configurable test board, designed for teaching purposes (FPGA programming)	2
2. A computing system based on the NIOS II processor.		2
3. Input / output ports (part one).		2
4. Input / output ports (part two).		2
5. Interrogation.		2
6. Interruption.		2
7. Assessment of knowledge. Test 1.		2
8. Multiprocessor systems.		2
9. Using the audio port.		2
10. Using the video port (part one).		2
11. Using the video port (part one).		2
12. Audio-video application.		2
13. Assessment of knowledge. Test 2.		2
14. Laboratory recoveries. Ending the situation.		2

Bibliography

1. Course notes (slides) made available to students in electronic format on the Office 365 platform, https://uoradea-my.sharepoint.com/personal/daniela_popescu_didactic_uoradea_ro/Documents/Forms/All.aspx
2. D.E.Popescu, C.Popescu, Architecture of computer systems, University Publishing House, laboratory supervisor, ISBN 973-613-225-9, 2002
3. Office 365 platform on which the laboratory works are loaded
4. Laboratory guide Computer systems architecture, Daniel Filipaș
5. Architecture and organization of conventional computing systems - laboratory works guide, revised edition,, University of Oradea Publishing House, ISBN: 978-606-10-0678-6

8.3 Academic project	Teaching methods	No. of hours/ Observations
1. Design of a microprogrammed system based on the NIOS II processor, starting from some given specifications.		
Design steps: 1. Presentation of project themes. Each student receives a homework assignment. 2. - 6. Realization of the system using the components of Quartus II Web Edition, writing programs to run on this system and fulfilling the requirements of the project theme, testing the system / programs with the Altera DE1 board, questions and answers related to the problems encountered, preparation of project documentation. 7. Project support, practical verification of operation and grading.	Students receive the design theme and design methodology and complete the project stages under the guidance of the teacher. The tools used are: ALTERA Quartus II Web Edition - integrated environment for the development and simulation of digital circuits ALTERA DE1 - Configurable test board, designed for teaching purposes (FPGA programming).	2 hours are allocated for each of the 7 detailed points of the laboratory activity.

Bibliography

1. ALTERA Quartus II Web Edition
2. Annexes of the laboratory supervisor - Daniel Filipaș Laboratory supervisor Computer systems architecture, Daniel Filipaș
3. Architecture and organization of conventional computing systems - laboratory works guide, revised edition,, University of Oradea Publishing House, ISBN: 978-606-10-0678-6

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	70%
10.6 Laboratory	- for mark 5 it is necessary to solve the corresponding number of requirements, depending on the test scale. - for mark 10, all requirements on the test sheet must be correctly resolved.	Tests during the semester The evaluation of students is done through two tests, taken during the semester. The arithmetic mean of the marks of these tests represents the mark with which they enter the exam. Students can also get extra points, depending on their participation in the laboratory and solving exercises with a higher degree of difficulty. These points can be used to calculate the test score.	30%
10.7 Project	- for mark 6, going through the design stages, without going into the design details. - for mark 10, going through all the design stages, with the completion of the	Oral presentation Following the presentation of the project completed during the semester, each student receives a grade, separate from the exam.	100%

	elaboration of the project theme.		

10.8 Minimum performance standard:

Assimilation of detailed knowledge about the construction, operation and design of central processing units for digital computers, as well as about the organization of different types of memories associated with them.

The studied design methods are exemplified on existing architectures, including the study of special architectures. A VHDL processor for the FPGA will be designed.

The term solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.

Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.

Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a discipline of work, done correctly and on time

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Modern Languages – English (3)**				
2.2 Holder of the subject			**Lecturer PhD. Abrudan Caciora simona Veronica**				
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**II**	2.5 Semester	**3**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**1**	of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum	**14**	Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**14**
Distribution of time					50
Study using the manual, course support, bibliography and handwritten notes					15
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					15
Tutorials					3
Examinations					2
Other activities.					
3.7 Total of hours for individual study	**36**				
3.9 Total of hours per semester	**50**				
3.10 Number of credits	**2**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of English
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic laboratory/project	- Mandatory presence at 80% of the seminars; - The seminar can be carried out face to face or online

6. Specific skills acquired

Professional skills	
Transversal skills	**CT3.** Effective use of information sources and resources of communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The seminar aims to be, for the students who do not have English as main subject, a means of improving the English knowledge they had acquired in high school, in order to reach the level of language competence that would alow them to understand and produce accurate academic and scientific texts in English, and understand written or verbal texts on topics related to the field of engineering in general and the specialization they have chosen, in particular. During the seminar, students are given the opportunity to produce written texts or to express themselves verbally, in English. In order to achieve these goals, the textbooks elaborated by the foreign languages team of the Department of Automated Systems Engineering and Management are used, as well as specialized books, published by well-known international publishing houses.
7.2 Specific objectives	• Acquiring field-related vocabulary in English and the completion of documents that are specific to the chosen field of study

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Electric Light Sources. Incandescent lamps. Halogen Lamps. Vocabulary exercises and discussion.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 2. Gerunds and Participles. Revision. Vocabulary and conversation exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 3 : **Low-pressure and High-pressure Discharge Lamps.** Revision and application exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 4. Infinitives (Revision).	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 5. Electric Power Distribution Systems. The Electric Circuit. Induction Heating (Writing and rephrasing exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 6: Computer Games Today. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 7: Changing the Structure of Information in a Sentence: the Passive Voice.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 8: Electric Machines: Electric Motors, Electric Generators. Transformers. Reading, Speaking.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 9: Review of Conditional Sentences.	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 10: Distribution Boards. (Listening and vocabulary exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 11: The Subjunctive Mood. (Revision and exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 12: Considerations on Electric Power Conversion.. (Reading and conversation exrcises**)**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 13: DC to DC Conversion. AC to DC Conversion. (Revision and exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 14: The distribution of electricity. Lectura de text si exercitii de vocabular**.**	Free exposure, with the presentation of the course with video projector, on the board or online	1h

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering,* Editura Universităţii "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, Benţea Violeta, *A Practical Course In English Science and Technology* , Editura Universitatii din Oradea, Oradea 2002
Beakdwood, L, *A first Course in Technical English*, Heinemann, 1978
Fitzgerald, Patrick,ș Marie McCullagh and Carol Tabor, *English for ICT Studies in Higher Education Studies*, Garnet Education, Reading, UK, 2011.
PPP- English for Science and Technology,Cavaliotti,Bucuresti, 1999

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of Technical Engish requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the	Written exam Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %

	subjects, without presenting details on them For 10: thorough knowledge of all subjects is required		

10.6 Minimum performance standard:
Seminary:
Capacity to use English in an appropriate way, depending on the context
Capacity to produce any of the documents, written in English, presented and discussed during the seminaries
Capacity to use grammatical structures accurately

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**Modern Languages – English (4)**			
2.2 Holder of the subject				**Lecturer PhD. Abrudan Caciora simona Veronica**			
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**1**	of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum	**14**	Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**14**
Distribution of time					50
Study using the manual, course support, bibliography and handwritten notes					15
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					15
Tutorials					3
Examinations					2
Other activities.					
3.7 Total of hours for individual study	**36**				
3.9 Total of hours per semester	**50**				
3.10 Number of credits	**2**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of English
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic laboratory/project	- Mandatory presence at 80% of the seminars; - The seminar can be carried out face to face or online
6. Specific skills acquired	

Professional skills	
Transversal skills	**CT3.** Effective use of information sources and resources of communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The seminar aims to be, for the students who do not have English as main subject, a means of improving the English knowledge they had acquired in high school, in order to reach the level of language competence that would alow them to understand and produce accurate academic and scientific texts in English, and understand written or verbal texts on topics related to the field of engineering in general and the specialization they have chosen, in particular. During the seminar, students are given the opportunity to produce written texts or to express themselves verbally, in English. In order to achieve these goals, the textbooks elaborated by the foreign languages team of the Department of Automated Systems Engineering and Management are used, as well as specialized books, published by well-known international publishing houses.
7.2 Specific objectives	• Acquiring field-related vocabulary in English and the completion of documents that are specific to the chosen field of study

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Computer Modeling and Software Used in Electrical Engineering.Vocabulary exercises and discussion.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 2. Computational electromagnetics (electromagnetic modeling): FDTD, FEM, BEM. Vocabulary and conversation exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 3 : **Programming Languages. L**istening exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 4. Simulation Software. Reading and vocabulary exerecises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 5. AutoCAD. (Reading and writing exercises. Writing a report)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 6: COMSOL Multiphysics. Reading a d vocabuary exercises**.**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 7: Mathcad. Speaking exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 8: MATLAB. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 9: Professional ethics. (Discussing aspects relating to the idea of ethics in the engineering domain. Vocabulary related to ethics, rights, laws, etc)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 10: Finding a Job in the field of Electrical Engineering. (Vocabulary relating to persuasion techniques).	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 11: Listening: Hisotry of Electrical Engineering.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 12: Speaking: Job interview. (Speaking, role-play and presentation of arguments**)**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 13: Writing Leaflets Promoting Education in Electrical Engineering. (Writing and vocabulary exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 14: Revision of concepts discussed throughout the semester. (Vocabulary exercises).	Free exposure, with the presentation of the course with video projector, on the board or online	1h

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering,* Editura Universităţii "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, Benţea Violeta, *A Practical Course In English Science and Technology* , Editura Universitatii din Oradea, Oradea 2002
Beakdwood, L, *A first Course in Technical English*, Heinemann, 1978
Fitzgerald, Patrick,ș Marie McCullagh and Carol Tabor, *English for ICT Studies in Higher Education Studies*, Garnet Education, Reading, UK, 2011.
PPP- English for Science and Technology,Cavaliotti,Bucuresti, 1999

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of Technical Engish requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the	Written exam Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %

	subjects, without presenting details on them For 10: thorough knowledge of all subjects is required		

10.6 Minimum performance standard:
Seminary:
Capacity to use English in an appropriate way, depending on the context
Capacity to produce any of the documents, written in English, presented and discussed during the seminaries
Capacity to use grammatical structures accurately

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	***AUTOMATIC SYSTEMS ENGINEERING AND MANAGEMENT***
1.4 Field of study	**AUTOMATIC SYSTEMS ENGINEERING AND MANAGEMENT**
1.5 Study cycle	***Bachelor (1^{st} cycle)***
1.6 Study program/Qualification	AUTOMATION AND APPLIED COMPUTING /Engineer

2. Data related to the subject

2.1 Name of the subject			**MEASUREMENTS AND TRANSLATORS**				
2.2 Holder of the subject			Şef. Lucrări. dr. ing. Marius CODREAN				
2.3 Holder of the academic seminar/laboratory/project			Şef. Lucrări. dr. ing. Marius CODREAN				
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	EX	2.7 Subject regime	I

Imposed ; (O) Optional; (F) Facultative

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which:: 3.2 course	2	3.3 academic laboratory	1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time					36 hours
Study using the manual, course support, bibliography and handwritten notes					10 hours
Supplementary documentation using the library, on field-related electronic platforms and in field- related places					8 hours
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10 hours
Tutorials					-
Examinations					8 hours
Other activities					-

3.7 Total of hours for individual study	**36**
3.9 Total of hours per semester	**78**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 Related to the curriculum	(Conditions)
4.2 Related to skills	-

5. Condiţii (acolo unde este cazul)

5.1. For the development of the course	video projector presentation
5.2. For the development of the academic seminary/laboratory/project	The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students with the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	C1. Use of knowledge of mathematics, physics, measurement technology, technical graphics, mechanical, chemical, electrical and electronic engineering in systems engineering. C3. Using the fundamentals of automation, methods of modeling, simulation, identification and analysis of processes, computer aided design techniques.
Transversal skills	Not the case.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general	The course is taught to second year *Computers* students. The course addresses notions that will allow future graduates to have a rich background on the use of techniques for measuring electrical and non-

objective of the subject	electrical quantities and data acquisition systems in electromechanical systems.
7.2 Specific objectives	▪ Identification, selection of terminology, concepts and methods in the technical and technological design of processes in the electrical and electronics industry ▪ Use of basic knowledge to explain and interpret problems that occur in the technical and technological design of electrical and electronic processes in compliance with quality conditions. ▪ Application of basic principles and methods for technical and technological design specific to electrical and electronic processes in conditions of qualified assistance. ▪ Elaboration of technical and technological projects related to the processes of activities in the field of Computers and Information Technology, by using established methods and principles ▪ Adequate use of criteria and standard methods for identifying, evaluating and modeling processes by applying computer programs, including graphical applications, specific to the field of Computers and Information Technology ▪ Elaboration of professional projects specific to some activities in the field of Computers and Information Technology, based on the selection and use of some principles, methods and IT applications

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter I INTRODUCTION 1.1. The object of the science of measurement 1.2. Classification of measurable quantities 1.3. The legal system of units of measurement 1.4. Standards	Interactive lecture; exposure; video projector presentation	2 hours
Chapter III MEASUREMENT ERRORS 2.1. Classification of measurement errors 2.2. Estimation of random errors 2.3. Estimation of systematic errors 2.4. Estimation of total errors for indirect measurement methods 2.5. Processing and presentation of measurement results 2.6. Informational interpretation of measurement errors	Interactive lecture; exposure; video projector presentation	2 hours
Chapter III ELECTRICAL METHODS AND MEASURES. METROLOGICAL CHARACTERISTICS 3.1. The measurement process 3.2. Classification of electrical measurement methods 3.3. Hierarchy of electrical measurement methods 3.4. Definition of electrical measuring instruments 3.5. Functional diagrams of electrical measuring instruments 3.6. Metrological characteristics of electrical measuring instruments	Interactive lecture; exposure; video projector presentation	2 hours
Chapter IV MEASURING MEANS IN DYNAMIC REGIME 4.1. Overview 4.2. Typical behaviors of measuring instruments	Interactive lecture; exposure; video projector presentation	2 hours
Chapter V ANALOGUE MEASURING MEASURES 5.1. Principles of operation of electromechanical instruments 5.2. Constructive elements of electromechanical instruments	Interactive lecture; exposure; video projector presentation	2 hours
Chapter VI. DIGITAL MEASURERS 6.1. Working principle and characteristics of digital devices 6.2. Components of digital devices	Interactive lecture; exposure; video projector presentation	2 hours
Chapter VII MEASUREMENT OF ELECTRIC CURRENT AND VOLTAGE 7.1. Current measurement. 7.2. Methods and means of measuring electrical voltage.	Interactive lecture; exposure; video projector presentation	2 hours
Chapter. VIII MEASUREMENT OF RESISTANCE AND IMPEDANCE 8.1. Overview 8.2. Measurement of resistances using simple ohmmeters 8.3. Measurement of resistances with bridge methods 8.4. Resistance - voltage converters 8.5. Measurement of circuit parameters R, L, C using a.c. bridges.	Interactive lecture; exposure; video projector presentation	2 hours
Chapter IX ELECTRICAL POWER MEASUREMENT 9.1. Introduction. 9.2. Power measurement in c. c. and c.a. single phase with electrodynamic wattmeter. 9.3. Active power measurement in polyphase circuits. 9.4. Reactive power measurement.	Interactive lecture; exposure; video projector presentation	2 hours
Chapter XI MEASUREMENT OF ELECTRICAL ENERGY 10.1. Generalities. 10.2. Electronic meters for measuring energy.	Interactive lecture; exposure; video projector presentation	2 hours
Chapter XI ARCHITECTURE OF ANALOG DATA ACQUISITION AND GENERATION SYSTEMS [1]	Interactive lecture; exposure;	2 hours

11.1. Generalities. 11.2. Data acquisition systems (DAS). 11.3. Data generation systems (DGS). 11.4. Interface techniques.	video projector presentation	
Chapter XII. ELECTRIC TRANSDUCERS 12.1. General considerations; 12.2. Resistive transducers; 12.3. Capacitive transducers; 12.4. Inductive transducers; 12.5. Induction transducers; 12.6. Thermoelectric transducers; 12.7. Galvanomagnetic transducers; 12.8. Photoelectric transducers; 12.9. Piezoelectric transducers.	Interactive lecture; exposure; video projector presentation	6 hours

Bibliography

1. Gordan M., - Măsurări electrice în electrotehnică, Ed. Universităţii din Oradea, 2003.
2. Gordan M., - Măsurări electrice şi sisteme de măsurare, Ed. Universităţii din Oradea, 2001.
3. Gordan M. – Măsurări electrice şi electronice, Ed. Universităţii din Oradea, 1999.
4. Gordan M. – Măsurări electrice şi electronice – Culegere de probleme, Lito Univ. din Oradea, 1998.
5. Gordan M., - Echipamente de măsură şi control, Ed. Universităţii din Oradea, 2003.
6. Gordan M. - *Măsurări electrice şi electronice* **–** Curs format electronic POSDRU DIDATEC 2013, p.291;
7. Vaibhavi A. Sonetha, *Electrical and Electronic Measurement*, 2019
6. Ignea, A, Stoiciu, D., *Măsurări electronice, senzori si traductoare*, Editura Politehnica, Timisoara, 2007
7. Pawan Chandani, *Electrical Measurements and Instrumentation*, 2017.
8. E. Nicolau şi colectiv - Manualul inginerului electronist, E.T. Bucureşti 1980.
9. Tânovan I. G., Metrologie electrică şi instrumentaţie, Ed. Mediamira Cluj - Napoca 2003.
10. Ciocârlea-Vasilescu, A., M. Constantin, Neagu I., *Tehnici de măsurare în domeniu*, Bucureşti, Ed. CD PRESS 2007.
11. C. Mich-Vancea, I.M. Gordan –*Traductoare, interfeţe şi Achiziţii de date*, Note de curs, Ed. Universităţii din Oradea 2010.
12. Ştefănescu C., Cupcea N., - Sisteme inteligente de măsurare şi control, Ed. Albastră Cluj-Napoca 2002.
12. Gordan M. şi colab. - Măsurări electrice în electrotehnică – Îndrumător de laborator, Ed. Universităţii din Oradea, 2003.
13. Gordan M., Tomşe M., - Măsurări în energetică - Îndrumător de laborator, Lito. Univ. din Oradea, 1999.
14. Gordan M., Tomşe M., - Măsurări electrice şi electronice - Îndrumător de laborator, Lito Univ. din Oradea, 1997.

8.2 Academic seminar	Teaching methods	No. of hours/ Observations
8.3 Academic laboratory		
1. Presentation of the content and requirements required for the proper conduct of laboratory work. Estimation of measurement errors and interpretation of results.	Practical application. Discussions	2 hours
2. Measurement of resistances by volt - ammeter method. Measuring resistances with simple direct current bridge.	Practical application. Discussions	2 hours
3. Checking the cathode ray oscilloscope. Real-time oscilloscope measurements.	Practical application. Discussions	2 hours
4. Power measurement in c.c. circuits. Measurement of active and reactive power in three-phase circuits.	Practical application. Discussions	2 hours
5. Introduction to the LabView interface program.	Practical application. Discussions	2 hours
6. Realization of a simple virtual instrument device.	Practical application. Discussions	2 hours
7. Recovery of laboratories. Ending the school situation.	Practical application. Discussions	2 hours
8.4 Academic project		

Bibliography

1. Gordan M., - Măsurări electrice în electrotehnică, Ed. Universităţii din Oradea, 2003.
2. Gordan M., - Măsurări electrice şi sisteme de măsurare, Ed. Universităţii din Oradea, 2001.
3. Gordan M. – Măsurări electrice şi electronice, Ed. Universităţii din Oradea, 1999.
4. Gordan M. – Măsurări electrice şi electronice – Culegere de probleme, Lito Univ. din Oradea, 1998.
5. Gordan M., - Echipamente de măsură şi control, Ed. Universităţii din Oradea, 2003.
6. Iliescu C., Ionescu-Golovanov C., şi alţii - Măsurări electrice şi electronice, E.D.P. Bucureşti 1983.
7. G. Ionescu - Măsurări şi traductoare, E.D.P. Bucureşti 1985.
6. Kishore K. Lal, *Electronic Measurement and Instrumentation*, PEI, 2009.
7. F. Auty, J. Williams, R. Stubins - Beginner's Guide to Measurement in Electronic and Electrical Engineering. NPL, 2014.
8. E. Nicolau şi colectiv - Manualul inginerului electronist, E.T. Bucureşti 1980.
9. Tânovan I. G., Metrologie electrică şi instrumentaţie, Ed. Mediamira Cluj - Napoca 2003.
10. Tiron M.- Teoria erorilor de măsurare şi metoda celor mai mici pătrate. E.T. Bucureşti 1972.

11. Pop E., Stoica V., Naforniţa I., Petriu E., - Tehnici moderne de măsurare, Ed. Facla Timişoara 1983.
12. Ştefănescu C., Cupcea N., - Sisteme inteligente de măsurare şi control, Ed. Albastră Cluj-Napoca 2002.
12. Gordan M. şi colab. - Măsurări electrice în electrotehnică – Îndrumător de laborator, Ed. Universităţii din Oradea, 2003.
13. Gordan M., Tomşe M., - Măsurări în energetică - Îndrumător de laborator, Lito. Univ. din Oradea, 1999.
14. Gordan M., Tomşe M., - Măsurări electrice şi electronice - Îndrumător de laborator, Lito Univ. din Oradea, 1997.
15. D. Belege, G. Gasparesc – Măsurări electrice și electronice. Aplicații practice, Ed. Politehnica Timișoara, 2019.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

Introduction in the courses and laboratory works of some subjects of interest for the profile economic environment in the industrial area of the city.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Active participation in developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basics on all topics covered.	Oral, online or written assessment.. Discussions. Argue.	70 %
10.5 Academic seminar	-	-	-
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the requirements imposed by the laboratory work. Well- documented arguments. Reading the required bibliography.	Written test. Practical test. Online test. Discussions. Argue.	30%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining a grade of 5 in each laboratory test; participation and fulfillment of all requirements imposed by each laboratory work; obtaining a grade of 5 in the course tests, as an arithmetic mean of the grades obtained in this type of activity. Knowledge of the basics on all the topics taught.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics/ Bachelor in engineering**

2. Data related to the subject

2.1 Name of the subject		**Systems Theory I**					
2.2 Holder of the subject		**Lecturer Phd. eng. Sanda DALE**					
2.3 Holder of the academic seminar/laboratory/project		**Lecturer Phd. eng. Sanda DALE**					
2.4 Year of study	**II**	2.5 Semester	**3**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2/-/-**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28/-/-**
Distribution of time					69 h
Study using the manual, course support, bibliography and handwritten notes					30
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					15
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of algebra, mathematical analysis, special math, physics, electronics, computer programming, MATLAB-SIMULINK
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	- Attendance at least 50% of the seminars - Minimum 5 grade at every test completed during the semester - The seminar can be held face to face or online
6. Specific skills acquired	

Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering. **C3.** Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques.
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The students should get familiar with the basic knowledge on control system theory, accompanied by applications and examples
7.2 Specific objectives	▪ The course presents theoretical elements on mathematical modelling, transfer funstions, system connections, block-schemes algebra, system sampling issues. ▪ The seminar helps the students to get familiar with the practical aspects related to the theoretical notions presented at the course, by solving specific applications.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Obs.
Chapter I: Basic notions on systems 1.1. Terminology 1.2. Control systems structures 1.3. Mathematical models for systems 1.4. Linear system concept. Non-linear systems 1.5. How to determine MM for systems	Free exposure, course presentation on video projector, on the board or online	8h
Chapter II . Calcullus elements for linear systems 2.1. Linearization on tangent 2.2. Transfer matrix and functions 2.3. Standard transfer elements 2.4. Systems with time delay 2.5. Mathematical modelling for system interconnections. Block-scheme algebra 2.6. Sampling continuous-time systems. Issues. Methods 2.7. Models for sampled-time systems		18h
Review of the course		2h

Bibliography

1. S. Dale, *Teoria sistemelor***,** notiţe de curs.
2. T.L. Dragomir, *Teoria sistemelor***,** *vol. I şi II***,** Editura Politehnica, Timişoara, 2004.
3. L.A. Zadeh, E. Polak, *Teoria sistemelor*
4. V. Ionescu, *Teoria sistemelor – Sisteme liniare.*
5. V. Ionescu, L. Lupaş, *Tehnici de calcul în teoria sistemelor – Sisteme liniare.*
6. V. Budişan, *Teoria sistemelor. Vol. 1 şi 2*

8.2 Academic seminar	Teaching methods	No. of hours/ Obs.

1. Examples for system theory applications in various domains 2. Mathematical modeling of electrical systems I 3. Mathematical modeling of electrical systems II 4. Mathematical modeling of mechanical systems 5. Examples for mathematical modeling of discrete-events systems 6. Simulation schemes for state-space models 7. Mathematical modeling for system interconnections (time-domain) 8. Mathematical modeling for system interconnections (block-scheme algebra) 9. Sampling the MM for continuous-time systems. RIST models in state-space 10. Sampling the MM for continuous-time systems. RIST models in state-space for systems with time-delay. 11. Sampling the MM for continuous-time systems. RIST models in input-output space. Pulse transfer function. 12. Sampling the MM for continuous-time systems. RIST models in input-output space. Pulse transfer function for systems with time-delay. 13. Sampling the MM for continuous-time systems. Approximation methods 14. Review of the seminar. Final test.	Solving specific applications. Discussions based on them.	2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h

Bibliografie

1. **S. Dale,** *Teoria sistemelor***,** notiţe de curs.
2. **T.L. Dragomir,** *Teoria sistemelor, vol. I şi II***,** Editura Politehnica, Timişoara, 2004.
3. **L.A. Zadeh, E. Polak**, *Teoria sistemelor*
4. **V. Ionescu**, *Teoria sistemelor – Sisteme liniare*.
5. **V. Ionescu, L. Lupaş**, *Tehnici de calcul în teoria sistemelor – Sisteme liniare.*
6. **V. Budişan**, *Teoria sistemelor. Vol. 1 şi 2*

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of this discipline can be find in the curriculum of other academic centers accredited for Automatics and Applied Informatics (Universitatea Tehnică din Cluj-Napoca, Universitatea din Craiova, Universitatea ,,Politehnica"din Timişoara, Universitatea Politehnica din Bucureşti, etc).
- Knowing the principles and the methods of control system analysis and their application is a stringent requirement of the employers in the domain which are have also concerns on control systems desig (Continental, Comau, Nidec, Celestica, Plexus etc).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods Evaluation can be made face-to-face and online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subject	**Written and oral presentation** The students have to solve theoretical and applicative subjects. The evaluation can be made face to face or online	70%
10.5 Academic seminar	Minimum required conditions for entering the exam (mark 5): in	**Written and oral testing** The students have to	30%

	accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subject	complete 4 tests during the semester, which they will present at the end Evaluarea se poate face faţă în faţă sau on-line.	
10.6 Laboratory			
10.7 Project			

10.8 Minimum performance standard:
Course:
- to acquire basic theoretical notions on systems theory
- to acquire the ability to determine the mathematical models for a system and to operate with them when is necessary (from transformations between models to modeling complex system interconnections)
- to operate with specific signal sampling and reconstruction methods in order to obtain various mathematical models or in different situations

Academic seminar:
- to acquire the ability to use in concrete applications the mathematical models for systems and to operate with them when the case (from transformations between models to modeling complex system interconnections)
- to operate with specific signal sampling and reconstruction methods in order to obtain various mathematical models or in different situations described by concrete applications

Laboratory:
Project:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics/ Bachelor in engineering**

2. Data related to the subject

2.1 Name of the subject		**Systems Theory II**					
2.2 Holder of the subject		**Lecturer Phd. eng. Sanda DALE**					
2.3 Holder of the academic seminar/laboratory/project		**Lecturer Phd. eng. Sanda DALE**					
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**5**	of which: 3.2 course	**2**	3.3 academic seminar/lab/project	**2/1/-**
3.4 Total of hours from the curriculum	**70**	Of which: 3.5 course	**28**	3.6 academic seminar/lab/project	**28/14/-**
Distribution of time					30 h
Study using the manual, course support, bibliography and handwritten notes					10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					8
Tutorials					
Examinations					4
Other activities.					
3.7 Total of hours for individual study	**30**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of algebra, mathematical analysis, special math, physics, electronics, computer programming, MATLAB-SIMULINK, System theory I
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	- Attendance at least 50% of the seminars - Minimum 5 grade at every seminar test completed during the semester - Attendance at least 6 from 7 labs; only 1 lab can be recovered - Every lab must be read before the completion - The seminar and the lab can be held face to face or online
6. Specific skills acquired	

Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering. **C3.** Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques.
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The students should get familiar with the basic knowledge on control system theory, accompanied by applications, simulations and examples
7.2 Specific objectives	▪ The course presents theoretical elements on time response, frequency response, system properties analysis and system quality ▪ The seminar helps the students to get familiar with the practical aspects related to the theoretical notions presented at the course, by solving specific applications. ▪ The laboratory helps the students to get familiar with modeling and simulation issues for control system theory using MATLAB-SIMULINK

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Obs.
Chapter III: Time-response and frequency response for linear systems. 3.1. Operating regimes 3.2. Time response calculus for linear systems 3.3. Frequency response for linear systems 3.4. Bode plots 3.5. Transfer plots (Nyquist)	Free exposure, course presentation on video projector, on the board or online	12h
Chapter IV. Control systems 4.1. System property analysis. Properties. 4.2. Stability. Definitions. Analysis: methods and criteria 4.3. Controlability. Definitions. Analysis: methods 4.4. Observability. Definitions. Analysis: methods 4.5. Control system structures 4.6. Quality indicators		14h
Review of the course		2h

Bibliography

1. S. Dale, *Teoria sistemelor***,** notiţe de curs.
2. T.L. Dragomir, *Teoria sistemelor, vol. I şi II***,** Editura Politehnica, Timişoara, 2004.
3. L.A. Zadeh, E. Polak, *Teoria sistemelor*
4. V. Ionescu, *Teoria sistemelor – Sisteme liniare.*
5. V. Ionescu, L. Lupaş, *Tehnici de calcul în teoria sistemelor – Sisteme liniare.*
6. V. Budişan, *Teoria sistemelor. Vol. 1 şi 2*

8.2 Academic seminar	Teaching methods	No. of hours/ Obs.

1. Time-response calculus for first order systems 2. Time-response calculus for first order systems to step input 3. Time-response calculus for first order systems to ramp input and Dirac pulse input 4. Time-response calculus for first order systems to real step input 5. Time-response calculus for first order systems to unit area pulse 6. Time-response calculus for second order systems 7. Frequency response for linear systems. Bode plots. 8. Transfer plot (Nyquist II) 9. Transfer plot (Nyquits) II 10. Stability analysis through fundamental stability theorem 11. Stability analysis through algebraic and frequency criteria 12. Stability analysis through root locus method 13. Controlability and observability analysis. Kalman criteria. 14. Review of the seminar. Final test.	Solving specific applications. Discussions and debates based on them.	2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h 2h
8.3. Laboratory	Teaching methods	No. of hours/ Obs.
L1. Physical systems modeling L2. Sampling methods for MM of continuous-time systems L3. Time-response calculus for linear systems L4. Frequency response calculus for linear systems L5. Stability analysis I. Stability criteria. L6. Stability analysis II. Stability methods. L7. Controlability and observability analysis	The students have to study the lab and complete the practical part guided by the teacher	2h 2h 2h 2h 2h 2h 2h

Bibliografie

1. S. Dale, M. Negrău, **Îndrumător de laborator de Teoria Sistemelor**, 102 pag.
2. M. Negrău, **Completări la Îndrumătorul de laborator de Teoria Sistemelor**, 170 pag. + programe

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of this discipline can be find in the curriculum of other academic centers accredited for Automatics and Applied Informatics (Universitatea Tehnică din Cluj-Napoca, Universitatea din Craiova, Universitatea ,,Politehnica"din Timişoara, Universitatea Politehnica din Bucureşti, etc).
- Knowing the principles and the methods of control system analysis and their application is a stringent requirement of the employers in the domain which are have also concerns on control systems desig (Continental, Comau, Nidec, Celestica, Plexus etc).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods Evaluation can be made face-to-face and online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subject	**Written and oral presentation** The students have to solve theoretical and applicative subjects. The evaluation can be made face to face or online	60%

10.5 Academic seminar	Minimum required conditions for entering the exam (mark 5): in accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subject	**Written and oral testing** The students have to complete 4 tests during the semester, which they will present at the end The evaluation can be made face to face or online	25%
10.6 Laboratory	Minimum required conditions for entering the exam (mark 5): in accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subject	Practical application For each lab, the students get a mark based on theoretical and practical knowledge and for the completion of the presentation. The final mark represents the average of these marks	15%
10.7 Project			

10.8 Minimum performance standard:

Course:

- to acquire basic theoretical notions on systems theory
- to acquire the ability to determine the mathematical models for a system and to operate with them when is necessary (from transformations between models to modeling complex system interconnections)
- to operate with specific signal sampling and reconstruction methods in order to obtain various mathematical models or in different situations

Academic seminar:

- to acquire the ability to use in concrete applications the mathematical models for systems and to operate with them when the case (from transformations between models to modeling complex system interconnections)
- to operate with specific signal sampling and reconstruction methods in order to obtain various mathematical models or in different situations described by concrete applications

Laboratory:

- to acquire the capacity to realize a practical simulation
- to acquire the ability to interpret the simulation results
- to participate to all labs

Project:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**Computer aided design in automation**			
2.2 Holder of the subject				**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**			
2.3 Holder of the academic laboratory/project				**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**			
2.4 Year of study	**II**	2.5 Semester	**2**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**DS**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1/1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**14/14**

Distribution of time	44
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledges of computer using, technical drawing, numerical methods, informatics
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development	- Attendance at least 50% of the courses

of the course	- The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online; - Cadence Orcad 9.2 and Matlab softwares installed on the computers in the laboratory classroom; - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	**C3.** Using the automation basis, the modelling, simulation, identification and analysis of processes, the technics of computer-aided design.
Transversal skills	**TC1.** Application, in the context of the laws respect, of the rights for intelectual property (including technological transfer), of the methodology of products certification, of the principles, norms and values of the professional ethics code in the own strategy for rigorous, efficient and responsible work. **TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working **TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline has as objective the selection and the evaluation, as a user, of the dedicated software and different tools for computer-aided design (CAD), for applications in the field of systems engineering, computers, information and communications technology.
7.2 Specific objectives	• Using the integrated hardware-software design (co-design) and the programming engineering as development methodologies, including the modelling at the system level.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. General presentation of the OrCAD 9 package software 1.1.OrCAD Capture 1.2.OrCAD PSPICE 1.3.OrCAD Layout	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
2. Electric schemes drawing 2.1.Electric schemes drawing with OrCAD Capture 2.2.Electric schemes processing	Free exposure, with the presentation of the course with video projector, on the board or online	6 h

3. Simulation of electric schemes working with OrCAD PSPICE 3.1.OrCAD PSPICE software 3.2.Setting of wave forms display in Capture 3.3.Verification of working electric schemes using OrCAD PSPICE	Free exposure, with the presentation of the course with video projector, on the board or online	8 h
4. Design of PCB (Printed Circuit Board) with OrCAD LAYOUT	Free exposure, with the presentation of the course with video projector, on the board or online	6 h
5. General presentation of MATLAB software package	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
6. Graphical interface in MATLAB	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
Total		**28 h**

Bibliography

1. D. Spoiala, **Proiectarea asistată în automatizari**, electronic format course for students, 2016
2. D.Pitică, C.Gheorghe,M.Dăbâcan, **Proiectarea plachetelor electronice**, Ed. Albastră,Cluj-Napoca, 1996
3. A.Câmpeanu, I.Jiveţ, **Orcad III**, Ed.Teora, Bucureşti, 1995
4. xxx, **OrCAD9**. Manual de utilizare, 2000
5. M.Ghinea, V.Fireţeanu, **MATLAB. Calcul numeric. Grafică. Aplicaţii**, Ed. Teora, Bucureşti, 1995
6. xxx, **The Student Edition of MATLAB version 6 User's Guide**, The MATH WORKS inc., Pretince Hall, New Jersey, 1995
7. D.M. Etter, **Engineering Problem Solving with MATLAB**, Pretince Hall, New Jersey, 1993
8. M.Postolache, **Metode numerice**, Ed.Sirius, Bucureşti, 1994

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Introductive concepts regarding the software package Cadence OrCAD 9.2. Schemes realization in OrCAD Capture. **2.** Schemes and sub-schemes in OrCAD Capture. **3.** Working simulation of the electric schemes. Simulation examples. **4.** The transfer from OrCAD Capture block in OrCAD Layout. **5.** PCB design in OrCAD Layout block. **6.** PCB routing in OrCAD Layout block. **7.** Recoveries and closing the situation at the laboratory.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a random test during the laboratory. The students carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h 2 h 2 h
Total		**14 h**

Bibliography

2. Dragoş Cristian Spoială, Eugen Ioan Gergely, **Proiectarea asistată în automatizări**, îndrumător de laborator, Ed. Universităţii din Oradea, 2009, ISBN 978-973-759-767-0, 128 pag..		
8.3.Academic project	Teaching methods	No. of hours/ Observations
1. Project theme presentation. 2. Drawing the electric scheme of a single-processor system. 3. Creating memory libraries with typified components. 4. Scheme processing. 5. Generating output reports and components list. 6. Printing the project. 7. Presentation of the project.	Students receive the themes for the project and carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h 2 h 2 h
Total		**14 h**
Bibliography 1.D. Spoială, **Proiectarea asistată în automatizări**, electronic format course for students, 2016 2.xxx, **OrCAD9**, Using manual, 2000		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics study program from other university centers that have accredited this specialization (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Bucharest, Gh. Asachi University of Iasi, etc.). The knowledges of computer-aided design in automation are important for the graduated students in their employment in the field of automation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (grade 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written verification during the semester** There are 2 verifications during the semester. The subjects are divided in 2 parts. For each of them the verification consists of a quiz with questions of theory and applications from all the courses. The final grade is calculated as the mean of the 2 grades obtained from the both verifications.	50 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard students have to carry out the laboratory works, without presenting	**Practical application** Each student receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	25%

	details on them For 10: complete performing of all laboratory works		
10.6.Project	Minimum required conditions for promotion (grade 6): in accordance with the minimum performance standard, browsing all the designing steps, without the deepening of the computations For 10 grade: browsing all the designing steps, finalizing all the computations and the electric schemes	**Oral presentation** After the project presentation and the work evaluation during the semester, each student receives a grade.	25%
10.7. Minimum performance standard: **Course**: usage of the concepts and instruments from the computer science and information technology field, in order to solve specific problems for system engineering; participation at least of half of courses. **Laboratory:** completion of the content of all laboratory works; participation to all the laboratory works. **Project:** completion of the content of all project works; participation to all the project works.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Computer networks**					
2.2 Holder of the subject		**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**					
2.3 Holder of the academic laboratory		**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**					
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**O/DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**2/0**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**28/0**
Distribution of time					48
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					2
Examinations					6
Other activities.					

3.7 Total of hours for individual study	**48**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Khowledge of computer using, informatics, operating systems
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - The computer network from the laboratory must be functional, being installed the software Packet Tracer - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of

	the discipline

6. Specific skills acquired	
Professional skills	**C3.** Using fundamentals of automatics, of modelling, simulation, identification and analysis methods for processes, of computer-aided design techniques. **C4.** Design, implementation, test, use and mentenance of the systems with equipments for general use and dedicated, including computer networks, for automation applications and applied informatics.
Transversal skills	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working **TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Reasoned using of the concepts of informatics and computer technology for solving well-defined problems in systems engineering field and in applications based on hardware and software using, in industrial systems or informatic systems.
7.2 Specific objectives	• Using the integrated hardware-software design (co-design) and the programming engineering as development methodologies, including the modelling at the system level.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction in networking. Classifications 1.1. Network types 1.2. Information transmission in the teleprocessing environments specific to automation field	Free exposure, with the presentation of the course with video projector, on the board or online	2h
2. Network programms 2.1. Hierarchies of protocols 2.2. Services oriented on connections and services without connections 2.3. Service primitives 2.4. The relationship between services and protocols	Free exposure, with the presentation of the course with video projector, on the board or online	2h
3. Reference models 3.1. OSI reference model 3.2. TCP/IP reference model 3.3. A comparison between OSI and TCP/IP reference models	Free exposure, with the presentation of the course with video projector, on the board or online	4h
4. Network examples 4.1. Internet 4.2. Networks connection-oriented 4.3. Ethernet 4.4. Wireless networks 802.11 4.5. Manual realization of the cabling	Free exposure, with the presentation of the course with video projector, on the board or online	4h

5. Physical level 5.1. Magnetic environment 5.1.1. Copper environments 5.1.2. Optical fiber 5.1.3. Wireless environments 5.1.4. Phone system 5.2. Access control to the environment	Free exposure, with the presentation of the course with video projector, on the board or online	2h
6. Network infrastructure 6.1. Network card 6.2. Equipments for data transmission	Free exposure, with the presentation of the course with video projector, on the board or online	2h
7. Data connection level 7.1. MAC functions 7.2. Framing and internet standard 7.2.1. Ethernet framework 7.2.2. Half-Duplex Ethernet (CSMA/CD Access Protocol) 7.2.3. Full-Duplex Ethernet 7.3. FDDI 7.4. Colision domain	Free exposure, with the presentation of the course with video projector, on the board or online	2h
8. Network level 8.1. Considerations 8.2. Optimal way identification and addressing 8.3. IP address and address classes 8.4. IP addressing in subnetworks 8.5. IP addresses assignment 8.6. Literally addressing	Free exposure, with the presentation of the course with video projector, on the board or online	4h
9. Transport level 9.1. 4 level role 9.2. General format of the protocols of the transport level 9.3. Number of ports 9.4. Number of the sequence and the confirmation	Free exposure, with the presentation of the course with video projector, on the board or online	2h
10. Session and presentation levels 10.1. General considerations 10.2. Presentation level	Free exposure, with the presentation of the course with video projector, on the board or online	2h
11. Application level 11.1. DNS - Domain Name Server 11.2. SNMP – A simple protocol simplu for network administration 11.3. Electronic mail 11.4. File Tranfer Protocol 11.5. World Wide Web 11.6. Administration of the data communication in the application level	Free exposure, with the presentation of the course with video projector, on the board or online	2h
TOTAL		**28h**

Bibliography

1. Dragoş-Cristian Spoiala, Silaghi Helga Maria – **Retele de calculatoare**. Curs pentru uzul studentilor,
2.A.S. Tanenbaum, **Reţele de calculatoare**, ediţia a patra, Byblos 2004
3.V. Ariton, **Reţele de calculatoare**, Universitatea „Dunărea de Jos”, 1998 Cisco Systems, CCNA 1 – Cisco Certified Network Academy Program – Network Basics
4.I. Bănică, **Reţele de comunicaţii între calculatoare**, Teora, 1998
5.G. Held, **Comunicaţii de date**, Teora, 1998

6. A. Munteanu, V.G. Serban, **Reţele locale de calculatoare – proiectare si administrare**, Polirom, 2003 7. L. Scripcariu, I.D. Scripcariu, **Reţele de calculatoare**, Tehnopress, 2006 8. Zinca, D. – **Reţele de calculatoare**, Editura Risoprint, Cluj-Napoca, 2006		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Realization of the crossover cable. 2. Configuration of a network board in Windows 2000/XP. 3. Windows commands for the network configuration. 4. Subnetworks configuration and IP-s calculation. 5. Packet Tracer application. General presentation. 6. Packet Tracer application. Devices configuration. 7. Routing protocols in Packet Tracer. 8.Configuration of the static and dynamic routes. 9. Configuration of the routers with CLI interface. Introduction. 10. Configuration of the routers with CLI interface. Applications. 11. ACL-s configuration (Access List Control). 12. Networks interconnection with switches. VLAN networks. 13. Creating VLAN-s and links of trunk type, using 802.1Q protocol. 14. Closing the situation at the laboratory.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h
TOTAL		**28 h**
Bibliography 1. Dragoş Cristian Spoială, Eugen Ioan Gergely , **Rețele de calculatoare**, Laboratory guide, Editura Universității din Oradea, 2010		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics of other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the working principle of the computer networks is very important in the field of automation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written verification during the semester** There are 2 verifications during the semester. The subjects are divided in 2 parts. For each of them the verification consists of a quiz with questions of theory and applications from all the courses. The final grade is calculated as the mean of the 2 grades obtained from the both verifications.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	**Practical application** Each student receives a grade for laboratory work during the semester and for the laboratory	40%

	students have to carry out the laboratory works, without presenting details on them For 10: complete performing of all laboratory works	work file. This results in an average for the laboratory.	

10.6 Minimum performance standard:

Course: usage of the concepts and instruments from the computer science and information technology field, in order to solve specific problems for system engineering; participation at least of half of courses.

Laboratory: completion of the content of all laboratory works; participation to all the laboratory works.

The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.

Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.

Elaboration and argumentative support of the application of a personal professional development plan.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Microprocessor systems I**					
2.2 Holder of the subject		**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**					
2.3 Holder of the academic laboratory		**Lecturer PhD eng. Zoltan Kovendi**					
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**O/DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1/0**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**14/0**

Distribution of time	62
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**62**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Khowledge of electrotechnics, electronics, electrical measurements, digital electronics
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory	- Mandatory presence at all laboratories; - The laboratory can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	**C5.** Development of applications and implementation of algorithms and structures for automated control, using project management principles, programming environments and technologies based on microcontrollers, digital processors, programmable controllers, embedded systems.
Transversal skills	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Is the students familiarization with the main types of programmable integrated circuits used in the digital control equipments of the industrial machineries.
7.2 Specific objectives	• The course has the aim to present the theoretical elements of the programmable integrated circuits used in the digital control of the industrial processes. • The laboratory familiarizes the students with practical aspects regarding the working principle of the systems with programmable integrated circuits from INTEL family, the programming modes used for these and the interconnection diagramms in order to obtain a control system.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction 1.1. The microprocessor and the programmable logic. 1.2. The standard architecture of a microsystem. 1.3. Microprocessors evolution. 1.4. Microprocessors capsules. 1.5. Microprocessors classification. 1.6. Microprocessors applications.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
2. Information organization in microsystems 2.1. Data and instructions organization in memory. 2.2. Data internal representation. 2.3. Instruction format. 2.4. Addressing modes. 2.5. The stack. 2.6. Memory segmentation.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
3. Central processing unit 3.1. The structure of a 8-bit microprocessor: Z80. 3.2. Microprocessor operating. 3.3. 8086 microprocessor architecture. 3.4. Microprocessor connections with the microsystem.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
4. Main memory 4.1. Memory organization of a microsystem. 4.2. Main memory addressing. 4.3. The connection principle of the memory circuits in the microsystem. 4.4. Memory circuits types and their use in microsystem.	Free exposure, with the presentation of the course with video projector, on the board or online	6h

5. Input/output operations 5.1. The role and the classification of input/output operations. 5.2. The programmed transfer. 5.3. The transfer through the interruption. 5.4. Typified parallel interfaces. 5.5. Serial interfaces. 5.6. Direct memory access transfer. 5.7. Delay circuits.	Free exposure, with the presentation of the course with video projector, on the board or online	12h
TOTAL		**28h**

Bibliography

1. Şt. Kakas, *Sisteme cu microprocesoare* (curs), Universitatea din Oradea, 1995,
2. I. Stojanov şi col., *De la poarta TTL la microprocesor* (vol. 2), Ed. Tehnică, Bucureşti, 1987,
3. A.W. Triebel, A. Singh, *Microprocesorul 8086*, Ed. Mirton, Timişoara, 1990,
4. M. Cornea-Hasegan, D. Cornea-Hasegan, *Proiectarea sistemelor cu microprocesor Z80*, Ed. Dacia, Cluj-Napoca, 1988.
5. Spoială Dragoș Cristian, *Sisteme cu microprocesoare*, curs pentru uzul studenților în format electronic, 2020

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. The presentation of the laboratory, of the work safety norms and the presentation of the laboratory works. 2. Arithmetic în computing systems. 3. ISA x86 architecture. 4. System with 32-bit microprocessor. 5. Programm elaboration methodology. 6. Programming and addressing methods. 7. Assembly programming of the 32-bit microprocessors. 8. Closing the situation at the laboratory.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	1 h 2 h 2 h 2 h 2 h 2 h 2 h 1 h
TOTAL		**14 h**

Bibliography

1. Spoială Dragoș Cristian, Kövendi Zoltan, *Sisteme cu microprocesoare*, laboratory guide in electronic format, 2017
2. **** Technical book of the development system with 32 bits microprocessor.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics of other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the working principle of the microprocessors systems is very important in the field of automation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary	**Written exam** The students get to solve 3 subjects with 3 levels of difficulty, of which scores summarize 10 mark.	60 %

	to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required		
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard students have to carry out the laboratory works, without presenting details on them For 10: complete performing of all laboratory works	**Practical application** Each student receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	40%

10.6 Minimum performance standard:

Course:

- Knowledge of the architecture and working principle of different types of microprocessors and microprocessors systems;
- The ability to identify a certain type of microprocessor system;
- The ability to design and programm the microprocessor systems;
- Participation at least of half of courses.

Laboratory:

- the ability to design a connection diagram with microsystem;
- the ability to realize a programm of application for a certain system;
- completion of the content of all laboratory works; participation to all the laboratory works.

The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.

Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.

Elaboration and argumentative support of the application of a personal professional development plan.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Microprocessor systems II**					
2.2 Holder of the subject		**Assoc. Prof. PhD eng. Dragoș Cristian Spoială**					
2.3 Holder of the academic laboratory		**Lecturer PhD eng. Zoltan Kovendi**					
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**O/DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1/0**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**14/0**

Distribution of time	62
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**62**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Khowledge of electrotechnics, electronics, electrical measurements, digital electronics
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory	- Mandatory presence at all laboratories; - The laboratory can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline
6. Specific skills acquired	

Professional skills	**C5.** Development of applications and implementation of algorithms and structures for automated control, using project management principles, programming environments and technologies based on microcontrollers, digital processors, programmable controllers, embedded systems.
Transversal skills	**TC1.** Application, in the context of the laws respect, of the rights for intelectual property (including technological transfer), of the methodology of products certification, of the principles, norms and values of the professional ethics code in the own strategy for rigorous, efficient and responsible work.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Is the students familiarization with the main types of programmable integrated circuits used in the digital control equipments of the industrial machineries.
7.2 Specific objectives	• The course has the aim to present the theoretical elements of the programmable integrated circuits used in the digital control of the industrial processes. • The laboratory familiarizes the students with practical aspects regarding the working principle of the systems with programmable integrated circuits from INTEL family, the programming modes used for these and the interconnection diagramms in order to obtain a control system.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction 1.1. Multiprocessor systems applications. 1.2. Interconnection and communication methods. 1.3. Interface blocks with the bus. 1.4. Addresses allocation. 1.5. Bus saturation.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
2. Multiprocessor systems with templated buses 2.1. MULTIBUS bus. 2.2. VME bus.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
3. Modules design for multiprocessor systems 3.1. 8086 microprocessor in maximum mode. 3.2. Single board computer (SBC) with 8086. 3.3. SBC modules with double port memories. 3.4. Slave modules design.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
4. Personal computers PC 4.1. Generalities. Block diagram. Processors generations. 4.2. Motherboard. 4.3. Main memory.	Free exposure, with the presentation of the course with video projector, on the board or online	2h

5. PC computers buses 5.1. ISA bus. 5.2. EISA bus. 5.3. PCI bus.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
6. Pentium processor 6.1. Internal architecture. 6.2. Working modes. 6.3. Segmentation. 6.4. Paging. 6.5. Protection mechanism. 6.6. Bus cycles. 6.7. PC main memory. 6.8. PC memory map. 6.9. Interrupting system. 6.10. PC DMA channels.	Free exposure, with the presentation of the course with video projector, on the board or online	8h
7. Multiprocessor systems development 7.1. Design steps for a microsystem. 7.2. Methods used for microsystems design.	Free exposure, with the presentation of the course with video projector, on the board or online	6h
TOTAL		**28h**
Bibliography **1.** Şt. Kakas, *Sisteme cu microprocesoare* (curs), Universitatea din Oradea, 1995, **2.** I. Stojanov şi col., *De la poarta TTL la microprocesor* (vol. 2), Ed. Tehnică, Bucureşti, 1987, **3.** A.W. Triebel, A. Singh, *Microprocesorul 8086*, Ed. Mirton, Timişoara, 1990, **4.** M. Cornea-Hasegan, D. Cornea-Hasegan, *Proiectarea sistemelor cu microprocesor Z80*, Ed. Dacia, Cluj-Napoca, 1988. **5.** Spoială Dragoș Cristian, *Sisteme cu microprocesoare*, curs pentru uzul studenților în format electronic, 2020		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Monitor programm commands. 2. Monitor programm resources. 3. Keyboard and display. 4. Analog-digital convertor. 5. Digital-analog converter. 6. Paralel interface. 7. Serial interface. 8. Closing the situation at the laboratory.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	1 h 1 h 2 h 2 h 2 h 2 h 2 h 2 h
TOTAL		**14 h**
Bibliography 1. Spoială Dragoș Cristian, Kövendi Zoltan, *Sisteme cu microprocesoare*, laboratory guide in electronic format, 2017 2. **** Technical book of the development system with 32 bits microprocessor.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics of other university centers that have accredited these specializations (Technical

University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the working principle of the microprocessors systems is very important in the field of automation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written verification during the semester** There are 2 verifications during the semester. The subjects are divided in 2 parts. For each of them the verification consists of a quiz with questions of theory and applications from all the courses. The final grade is calculated as the mean of the 2 grades obtained from the both verifications.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard students have to carry out the laboratory works, without presenting details on them For 10: complete performing of all laboratory works	**Practical application** Each student receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	40%

10.6 Minimum performance standard:

Course:

- Knowledge of the architecture and working principle of different types of microprocessors and microprocessors systems;
- The ability to identify a certain type of microprocessor system;
- The ability to design and programm the microprocessor systems;
- Participation at least of half of courses.

Laboratory:

- the ability to design a connection diagram with microsystem;
- the ability to realize a programm of application for a certain system;
- completion of the content of all laboratory works; participation to all the laboratory works.

The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.

Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.

Elaboration and argumentative support of the application of a personal professional development plan.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
1.4 Field of study	Systems engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Applied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Programmable logic controllers and microprogramming					
2.2 Holder of the subject		Assoc. prof. GERGELY Eugen-Ioan					
2.3 Holder of the academic seminar/laboratory/project		Assoc. prof. GERGELY Eugen-Ioan					
2.4 Year of study	3	2.5 Semester	6	2.6 Type of the evaluation	Examination	2.7 Subject regime	Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	5	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	-/2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	-/28/14
Distribution of time					34 hours
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					7
Tutorials					4
Examinations					2
Other activities.					
3.7 Total of hours for individual study	**34**				
3.9 Total of hours per semester	**104**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	- The course room has to be provided with a video-projector - The course can be carried out face to face or online
5.2.for the development of the academic seminary/laboratory/project	- The laboratory/project facility has to be provided with the necessary equipments - Students presence to all laboratory/project hours is compulsory - Students must have summarized the current laboratory work - Maximum 4 laboratory works (30%) can be recovered during the semester

	- A participation below 70% at the laboratory works / project leads to the restoration of the subject - Each student will receive a project specification - Students have to accomodate with the rhythm of elaboration and writing of the project - Students have to provide and to defend their project - The laboratory / project hours can be carried out face to face or online

6. Specific skills acquired	
Professional skills	C5. Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems
Transversal skills	CT2. Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working CT3. Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The subject is a guide for using and design of PLC systems. During the course it will be presented the PLC struture and functionning, based on examples from various PLC manufacturers. The laboratory is based on the Texas Instruments TI305 PLC. During the project hours the students will approach the control of various plants by using PLCs. Each student will receive an individual project specification.
7.2 Specific objectives	▪ To create the abilities for analyzing, design, implementation and troubleshooting of PLC programs and systems ▪ To acquire the necessary skills for programs design, PLC communication and programs execution monitoring ▪ To provide the ability to identify and exploit the resources of a PLC

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. The computing systems and the industrial control	face to face or online interactive presentation	4 hours
2. The structure of the PLCs	face to face or online interactive presentation	6 hours
3. Programming languages	face to face or online interactive presentation	6 hours
4. Special functions	face to face or online interactive presentation	6 hours
5. Programming techniques	face to face or online interactive presentation	6 hours

Bibliography

1. E. Gergely, H. Silaghi, V. Spoială, L. Coroiu, Z. Nagy, Automate programabile. Operare, programare, aplicaţii, Editura Universităţii din Oradea, Oradea, ISBN 978-973-759-940-7, 2009.
2. J.A. Rehg and G.J. Sartori, Programmable Logic Controllers (2nd Edition), Prentice Hall, 2 edition, 2008.

8.2 Laboratory	Teaching	No. of hours/

	methods	Observations
1. Labor protection. Presentation of laboratory works.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
2. General presentation of the PLC TI305. The handheld programmer.	Laboratory work summary and practical demonstrations using specific equipments	4 hours
3. The PLC instruction set	Laboratory work summary and practical demonstrations using specific equipments	4 hours
4. Base racks and discrete I/O modules	Laboratory work summary and practical demonstrations using specific equipments	2 hours
5. Timers and counters	Laboratory work summary and practical demonstrations using specific equipments	4 hours
6. Analog input modules	Laboratory work summary and practical demonstrations using specific equipments	4 hours
7. Analog output modules	Laboratory work summary and practical demonstrations using specific equipments	4 hours
8. PLC stage programming	Laboratory work summary and practical demonstrations using specific equipments	2 hours
9. Completion of the laboratories situation	Laboratory work summary and practical demonstrations using specific equipments	2 hours
Bibliography 2. Gergely E.I., Automate programabile. Aplicatii, 92 pag., Editura Universitatii din Oradea, CD-ROM EDITION ISBN: 978-606-10-1474-3, 2014 2. Gavriş M., Gergely E.I., Conducerea proceselor cu automate programabile, Editura Mediamira Cluj-Napoca, 2003.		
8.3 Project	Teaching methods	No. of hours/ Observations
1.Presentation of the design specification. Presentation of the content of the project.	Interactive presentation,	2 hours

	examples, individual work	
2. Identification of I/O signals.	Interactive presentation, examples, individual work	2 hours
3. The selection of I/O modules. The selection of the base rack. The configuration of the PLC. Allocation of I/O and memory addresses.	Interactive presentation, examples, individual work	2 hours
4. Programming the PLC in Ladder Diagram and Instruction List	Interactive presentation, examples, individual work	4 hours
5. Program testing	Interactive presentation, examples, individual work	2 hours
6. Project delivering and defending	Interactive presentation, examples, individual work	2 hours

Bibliography

1. E.I. Gergely, Nagy Z.T., Spoială V., Automate programabile, Îndrumător de proiect, Editura Universităţii din Oradea, Oradea, 2009.
2. F. Petruzella, Programmable Logic Controllers, Career Education, 3 edition, 2004.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be made face to face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For mark 10: - thorough knowledge regarding the architecture of the PLCs - thorough knowledge regarding the execution of PLC programs - thorough knowledge regarding the PLC programming languages - thorough knowledge regarding the PLC	Written examination	60%

	programming techniques		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10: - thorough knowledge regarding the structure of the TI305 PLC - thorough knowledge regarding the operation and use of the TI305 PLC - thorough knowledge regarding the programming of the TI305 PLC -	Knowledge assessment test	20%
10.7 Project	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10: - thorough knowledge regarding the design of combinatorial and sequential circuits - thorough knowledge regarding the structure of the TI305 PLC - thorough knowledge regarding the identification and wiring of I/O signals - thorough knowledge regarding the operation and use of the TI305 PLC - thorough knowledge regarding the programming of the TI305 PLC and program testing	Project completion and defending	20%

10.8 Minimum performance standard:

Course:

- knowledges regarding the structure of the PLCs
- knowledges regarding the PLC program execution
- knowledges regarding the programming languages of the PLCs
- knowledges regarding the PLC programming techniques

Laboratory:

- knowledges regarding the structure of the TI305 PLC
- knowledges regarding the operation and use of the TI305 PLC
- knowledges regarding the programming of the TI305 PLC

Project:

- knowledges regarding the design of combinatorial and sequential circuits
- knowledges regarding the structure of the TI305 PLC
- knowledges regarding the identification and wiring of I/O signals
- knowledges regarding the operation and use of the TI305 PLC
- knowledges regarding the programming of the TI305 PLC and programs testing

SUBJECT DESCRIPTION

1. Data about the program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty / Department	**FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY**
1.3 Department	**DEPARTMENT OF ELECTRICAL ENGINEERING**
1.4 Field of study	**CONTROL SYSTEMS ENGINEERING**
1.5 The study cycle	**BACHELOR OF SCIENCE**
1.6 Study program / Qualification	**AUTOMATICS AND APPLIED INFORMATICS / BACHELOR OF ENGINEERING**

2.Data related to the subject

2.1 The name of the subject	**ELECTRICAL SERVOSYSTEMS**						
2.2 The holder of the subject	**Professor PhD eng. Tonţ Dan George**						
2.3 Holder of the academic seminar/ laboratory / project	**Professor PhD eng. Tonţ Dan George**						
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of evaluation	**Colloquim**	2.7 Subject regime	**DS**

3. Estimated total time

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 laboratory /project	**1**
3.4 Total hours in the curriculum	**42**	of which: 3.5 course	**28**	3.6 laboratory /project	**14**
Distribution of time fund hours					**62**
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorial					2
Examinations					6
Other activities					

3.7 Total hours of individual study	**62**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre - requisites (where applicable)

4.1 related to curriculum	Knowledge of electrical engineering, physics and mathematics
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- attendance at least 50% of the courses
5.2. for the development of the academic seminary/laboratory/project	- Mandatory attendance at all laboratory classes; - Students come with inspected laboratory work - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Competențe profesionale	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering. **C4.** Design, implementation, testing, use and maintenance of general-purpose systems and dedicated equipment, included computer networks for automation and applied informatics applications. **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Competențe transversale	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline

7.1 The general objective of the subject	The purpose of the course is - Study of mechanical quantity adjustment systems for motion control. - The dynamic models of the electric d.c. servomotors are presented. and that. constructive, functional aspects - Control structures and design techniques for speed and position control systems.
7.2 Specific objectives	- Presentation of some calculation methods, in a unitary framework, which are necessary to solve the problems in classical or modern electrical engineering. - Greater emphasis was placed on practical applications, the course containing examples of calculation. - The seminar familiarizes students with theoretical aspects regarding the operation of servosystems

8. Content

8.1 Course	Teaching methods	Observations
1. Introductory notions. Notions of linear dynamic system. Modeling dynamic systems. Analysis of linear systems in the field of time. Systems connection. Characteristics of control systems. Automatic positioning system. Principle functional diagram of automatic positioning systems. Classification of automatic positioning systems.	Free presentation, with the presentation of the course on the overhead projector and on the board	4h/ weekly 1+ weekly 2
2. Structures and systems for regulation and process management. General considerations. Cascade control systems. Automatic control systems with reaction according to state variables. Disturbance compensation systems and combined control systems. Parallel automatic adjustment systems. Automatic adjustment systems with dead time compensation	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 3
3. Transducers used in positioning servosystems. Definition. Structure. Characteristics. Classification. Position transducers. Speed transducers. Acceleration transducers. Selsine.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 4

4. Regulators Generalities. Continuous regulators. Nonlinear regulators. Discrete regulators	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 5
5. Mechanical transmission Choice of mechanical transmission. Mechanical parameters of servosystems. Mechanical transmission identification.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 6
6. Analysis of automatic positioning systems Mathematical structure and model. The influence of the parameters of the component elements on the behavior of the servosystem. Special control problems of electric servosystems	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 7
7. Materials used in the construction of servomotors Magnetic materials. Conductive materials. Electrical insulating materials.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 8
8. Actuators of d.c. The mathematical model of the d.c. servomotor physical characteristics of dc servomotors.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 9
9. Stepper motors. Generalities. Classification of stepper motors. Variable reluctance stepper motors. Stepper motors with permanent magnets. Stepper motors with hybrids. Linear stepper motors. Characteristic sizes of stepper motors. Powering the motors step by step. Micropassage regime. Simplified mathematical models of stepper motors.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 10
10. Synchronous actuators with permanent magnets. Mathematical model of the synchronous servomotor with permanent magnets in dynamic mode. Adjusting the speed of the synchronous actuator with permanent magnets	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 11
11. Electronic control of SCC with permanent magnets Static DC power converters. PWM type converters. General structure, electrical diagram of the energy circuit. Dynamic models of static power converters (controlled rectifier, PWM converters)	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 12
12. Positioning systems with d.c. servosystems. Getting started. Experimental award criteria. Linear positioning systems. Nonlinear positioning systems. Incremental positioning systems	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 13
13. Analysis of electromechanical systems. The order continues. Discrete command. System model in state quantities. Discrete control of positioning systems. Controllability and observability.	Free presentation, with the presentation of the course on the overhead projector and on the board	2h/ weekly 14

Bibliography

1. Tonţ D. G., Servosisteme electrice – note de curs.
2. Kuo B. C., Kelemen A., Sisteme de comandă şi reglare incrementală a poziţiei. Ed. Tehnică, Bucureşti, 1981.
3. Trifa V. Servomecanisme curs litografiat, 1981.
4. Trifa V., Servomecanisme aplicaţii litografiat, 1989.
5. Vas S., Sensorless vector and direct torque control, Oxford, University Press, 1996.

8.2 Laboratory	Teaching methods	Observations
1. Automatic systems, Study of typical regulation laws 2. Tuning of PID controllers, Status adjustment 3. Automatic adjustment systems used in servosystems - overview 4. DC servomotor model 5. DC voltage source model 6. Analog current control system for MCC using PI regulators 7. Automatic adjustment systems used in servo systems. The d. c. servomotor model 8. Analog current control system for MCC using PI regulators 9. Analog speed control system. Saturation of analog regulators 10. Digital current control system for MCC using PI regulators 11. Digital speed control system for MCC using PI controllers 12. Saturation of digital PI regulators 13. Recoveries	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. The development of laboratory works is based on the interactive teacher-student partnership. Then, the students carry out the practical part of the work under the guidance of the teacher. Free presentation on how to make the assemblies and check them after the students have made the assembly.	2h/ weekly 1 2h/ weekly 3 2h/ weekly 5 2h / weekly 7 2h / weekly 9 2h / weekly 11 2h / weekly 13 Total 14 h

Bibliography

1. Kuo B. C., Kelemen A., Sisteme de comandă şi reglare incrementală a poziţiei. Ed. Tehnică, Bucureşti, 1981.
2. Trifa V. Servomecanisme curs litografiat, 1981.
3. Trifa V., Servomecanisme aplicaţii litografiat, 1989.
4. Vas S., Sensorless vector and direct torque control, Oxford, University Press, 1996.

8.3. Project	Teaching methods	Remarks
Design stages		

9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Electrical Engineering and other university centers in Romania that have accredited these specializations, so knowledge of servosystems is a stringent requirement of employers in the field in the Oradea Industrial Park area.

10. Evaluation The evaluation can be done face to face or online

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The exam consists of checking knowledge by solving problems and a theory part in writing (1.5 hours)	The examination is written and oral.	40%

	The student at the exam must know Knowledge for grade 5: - the fundamental aspects of the electric servosystems field - main characteristics of electric actuators Knowledge for grade 6: - Representation of linear dynamic systems by transfer functions Knowledge for grade 7: - knowledge of structures and systems for regulation and management of processes Knowledge for grade 8: - Granting PID regulators Knowledge for grade 9: - Prediction adjustment, status adjustment Knowledge for grade 10: - some aspects related to the design of automatic control systems, the use of computer simulation programs		10% 10% 10% 10% 10% 10%
10.5 Laboratory	Knowledge for grade 5: Knowledge of the development of the work with the appropriate stages Knowledge for grade 6: Equipment needed to perform the work Knowledge for grade 7: Correct reading of measurements Knowledge for grade 8: Correct completion of the tables related to the paper Knowledge for grade 9: Correct drawing of the graphics specific to each work Knowledge for grade 10: Possibility to answer the questions at the end of the works	Systematic and independent observation, experiment, case study, computer-assisted learning, study methods using models	40% 10% 10% 10% 10% 10% 10%
10.6 Project			
10.7 Minimum performance standard			
Course: - Knowledge of the constructive parts and the principle of operation of the different servosystems. - Ability to identify a certain type of electrical circuit - Participation in at least half of the courses **Laboratory:** - Ability to design and read a wiring diagram - Ability to theoretically solve some requirements; - Participation in all laboratory work.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject		**Dynamic systems with discrete events**					
2.2 Holder of the subject		**Lect. PhD eng. Coroiu Laura**					
2.3 Holder of the academic laboratory		**Lect. PhD eng. Diana Mesaros**					
2.4 Year of study	**III**	2.5 Semester	**1I**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**O**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academiclaboratory	**14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	7
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	- The laboratory can be carried out face to face or online - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	C3. Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques.
Transversal skills	CT2. Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working. CT3. Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline aims to provide students with all the necessary basics, later in solving problems, the solutions being analytical and / or computer-assisted. • A special contribution to the development of investigation skills is brought by a series of applications that compare and correlate the results of analytical solutions with those obtained by the computer. The Petri Net Toolbox environment was used for the computer-assisted approach to the solutions.
7.2 Specific objectives	• The course explores the theoretical and practical framework of discrete event systems using non-timed, timed and stochastic timing Petri nets, addressing the study of their behavioral and structural problems. • The laboratory familiarizes students with practical aspects regarding the methods of implementation and study of the structural and behavioral characteristics of computer-assisted SED.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Non-timed Petri nets	Free exposure, with the presentation of the course with video projector, on the board or online	6h
2. Ordinary Petri nets and behavioral properties	Free exposure, with the presentation of the course with video projector, on the board or online	8h
3. Study of structural properties	Free exposure, with the presentation of the course with video projector, on the board or online	8h
4. Petri net models with deterministic timing	Free exposure, with the presentation of the course with video projector, on the board or online	6h
5. Petri net models with stochastic timing.	Free exposure, with the presentation of the course with	6h

	video projector, on the board or online	
Bibliography 1. Coroiu Laura- course notes, 2020. 2. Octavian Păstrăvanu Mihaela Matcovschi Cristian Mahulea, *Aplicaţii ale reţelelor petri în studierea sistemelor cu evenimente discrete*, Editura Gh. Asachi 2002.		
8.2 Academic Laboratory	Teaching methods	No. of hours/ Observations
1. Labor protection norms. Introduction to Discrete Event Systems 2. Applicability of discrete event systems. Transposing systems with discrete events into industrial / software processes 3. Theoretical aspects and applicability of Petri Nets. Proposed exercises and problem. 4. Theoretical aspects and applicability of Grafcet I. Proposed exercises and problem. 5. Types of diagrams used in industrial / software processes I. Data flow diagrams, Sequential diagrams. UML diagrams. 6. Types of diagrams used in industrial processes / software II 7. Closing the situation at the laboratory	Students receive the project theme and design methodology and under the guidance of the teacher perform the project stages	2h/laboratory every 2 weeks
Bibliography 1. Thomas and Angela Hathaway, Data Flow Diagrams – Simply Put!: Process Modeling Techniques for Requirements Elicitation and Workflow Analysis, BA-Experts, 29 mar. 2015 - 75 pagini 2. https://app.diagrams.net/ 3. https://www.atlassian.com/		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Control Systems in Engineering from other university centers that have accredited similar specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of Dynamic systems with discrete events is a stringent requirement of employers in the field (Comau, FaistMekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	**Writing examination** Students receive for solving each a form with 3 subjects of theory and an application.	70 %
10.5 Laboratory	Minimum required conditions for promotion (grade 6): knowledge of the purpose of the paper, the content and requirements of the experimental part; For 10: detailed knowledge of how to perform all laboratory work.	**Oral presentation** Following the presentation at the laboratory completed during the semester, each student receives a grade.	30%

10.6 Minimum performance standard:

Course: - Ability to describe the operation of a Petri net related to a process;
- Participation in at least half of the courses.

Laboratory: - Ability to read and implement a Petri net diagram;
- Participation in all laboratory works.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Electrical machines and drives I**				
2.2 Holder of the subject			**Prof. PhD eng. Helga Silaghi**				
2.3 Holder of the academic laboratory			**Lect. PhD eng. Viorica Spoială**				
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic laboratory	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	10
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**74**
3.9 Total of hours per semester	**130**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	- Mandatory presence at all laboratories; - The laboratory can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems
Transversal skills	**TC1.** Application in the context of legislative compliance, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of professional ethics code in their own strategies for rigorous, efficient and accountable work **TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline has as objective the familiarization of the students from the specialization Automation and applied informatics, with the field of electric drives. Theoretical and practical knowledge on the technique of electric drives is provided, as well as research, design and use of electric drive systems with direct current machines.
7.2 Specific objectives	• The course aims to present the theoretical elements of the technique of electric drives, electric drives with direct current electric machines • The laboratory familiarizes students with practical aspects of the operation of the electric drive system, the control methods of electrical actions with DC machines, including modern control methods with programmed logic and computer control.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1.Subject of electrical drives 1.1.Introduction in electrical drives 1.2.Structure and construction of electrical drive systems	Free exposure, with the presentation of the course with video projector, on the board or online	 2h 2h
2.General problems of electrical drives technology 2.1.The object of the kinematics and dynamics of electrical drives. Motion equation 2.2.Reporting of couples, moments of inertia, strength and mass 2.3.Mechanical characteristics of electric machines and working mechanisms 2.4.Transmission of the movement from the electric machine to the working mechanism. Electromagnetic couplings 2.5.Stability of electrical drives systems	Free exposure, with the presentation of the course with video projector, on the board or online	4h 2h 4h 2h 2h
3.Electrical drives with DC machines 3.1.Electrical drives with DC machines 3.2. Drives with permanent magnets direct current machines 3.3.Reversible drives with DC machines	Free exposure, with the presentation of the course with video projector, on the board or online	6h 2h 2h

Bibliography

1. SILAGHI H., SPOIALĂ V., SILAGHI M. – *Acţionări electrice*, Editura Mediamira , Oradea, 2009

2. SILAGHI, H., SPOIALĂ, VIORICA, *Acţionări electrice-probleme fundamentale şi noţiuni de proiectare*, Ed. Universităţii din Oradea, 2002

3. SILAGHI H., SILAGHI M. – *Sisteme de acţionări electrice cu maşini asincrone*, Editura Treira , Oradea, 2000
4. IANCU V., SPOIALĂ D., SPOIALĂ VIORICA, *Maşini electrice şi sisteme de acţionări electrice*, vol.II, Ed. Universităţii din Oradea, 2006
5. RICHARD CROWDER, *Electric drives and electromechanical systems*, Elsevier, Great Britain, 2006
6. VIORICA SPOIALĂ, HELGA SILAGHI, *Acţionări electrice speciale*, Editura Universităţii din Oradea, 2010

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms and of the conventional signs specific to the field of electric drives.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher.	2 h
2. Introduction to the Matlab - Simulink simulation environment, with applications in electric drives		2 h
3. Use of the Simulink program to simulate drives with direct current and separate excitation machines		2 h
4. Methods and schemes for starting the DC motors		4 h
5. The study of an electric drive system with DC motors powered by PWM converter		4 h
6. Simulation of the operation of a DC motor system powered by VTC, closed circuit		2 h
7. Study of an electric drive system with d.c. motor controlled with PLC		2 h
8. Methods and schemes for starting asynchronous motors		4 h
9. Starting with resistors in the rotor circuit of asynchronous machines with coiled rotor		2 h
10. Changing the speed of drives with asynchronous machines by changing the frequency of the supply voltage		2 h
11. Closing the situation at the laboratory.		2 h

Bibliography
3. SILAGHI H.,SPOIALĂ V.,COSTEA C. - *Acţionări electrice* , Îndrumar de laborator, Lito Universitatea din Oradea, 2008
4. Viorica Spoială, Helga Silaghi, Dragoş Spoială – Acţionări electrice. Indrumator de laborator. Universitatea din Oradea, ISBN 978-606-10-1432-3, Ediţie CD-ROM, 140 pag, 2014

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	70 %

	is required		
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	30%
10.6 Minimum performance standard: Course: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations (analytical and numerical) with physical quantities. Laboratory: Development and implementation of algorithms and automation structures based on electrical drives, microcontrollers, signal processors, PLCs, embedded systems, etc. by using the principles of project management The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Electrical machines and drives II**				
2.2 Holder of the subject			**Prof. PhD eng. Helga Silaghi**				
2.3 Holder of the academic laboratory/project			**Lect. PhD eng. Viorica Spoială/ Lect. PhD eng. Claudiu Costea**				
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**5**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**2/1**
3.4 Total of hours from the curriculum	**70**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**28/14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	26
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	
Examinations	9
Other activities.	

3.7 Total of hours for individual study	**60**
3.9 Total of hours per semester	**130**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems
Transversal skills	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working **TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline has as objective the familiarization of the students from the specialization Automation and applied informatics, with the field of electric drives. Theoretical and practical knowledge on the technique of electric drives is provided, as well as research, design and use of electric drive systems with AC machines.
7.2 Specific objectives	• The course aims to present the theoretical elements of the technique of electric drives, electric drives with different AC machines • The laboratory familiarizes students with practical aspects of the operation of the electric drive system, the control methods of electrical actions with AC machines, including modern control methods with programmed logic and computer control. • The project provides the necessary knowledge to the students to be able to design an electric drive in the field of lifting and transport equipment.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1.Electrical drives with asynchronous machines 1.1.General relationships and mechanical features for electrical drives with asynchronous machines 1.2.Methods of starting for electrical drives with asynchronous machines 1.3.Braking methods for electrical drives with asynchronous machines 1.4.Speed control for electrical drives with asynchronous machines	Free exposure, with the presentation of the course with video projector, on the board or online	2h 4h 2h 4h
2.Asynchronous machines control systems with variable frequency supply 2.1.Mathematical model of the induction machine 2.2.Induction machine simulation using LabVIEW 2.3.Vector control systems for induction machine speed	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h
3.Electrical drives with synchronous machines 3.1.General relationships and mechanical features for electrical drives with synchronous machines 3.2.Methods of starting for electrical drives with synchronous machines 3.3.Braking methods for electrical drives with synchronous machines 3.4.Speed control for electrical drives with aynchronous machines 3.5.Brushless synchronous machine drives	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h 2h 2h
Bibliography 1. SILAGHI H., SPOIALĂ V., SILAGHI M. – *Acţionări electrice*, Editura Mediamira , Oradea, 2009		

2. SILAGHI, H., SPOIALĂ, VIORICA, *Acţionări electrice-probleme fundamentale şi noţiuni de proiectare*, Ed. Universităţii din Oradea, 2002
3. SILAGHI H., SILAGHI M. – *Sisteme de acţionări electrice cu maşini asincrone*, Editura Treira , Oradea, 2000
4. IANCU V., SPOIALĂ D., SPOIALĂ VIORICA, *Maşini electrice şi sisteme de acţionări electrice*, vol.II, Ed. Universităţii din Oradea, 2006
5. RICHARD CROWDER, *Electric drives and electromechanical systems*, Elsevier, Great Britain, 2006
6. VIORICA SPOIALĂ, HELGA SILAGHI, *Acţionări electrice speciale*, Editura Universităţii din Oradea, 2010

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms and of the conventional signs specific to the field of electric drives. 2. Control of the main shaft to the machine tool GPR 45 NC. Speed selection 3. Control of advances to the GPR 45 NC machine tool 4. Control the revolver head on the GPR 45 NC machine tool 5.Troubleshooting conventional wiring diagrams of the GPR 45 NC machine tool 6. Design of electrical control diagrams taking into account certain operating restrictions 7. Study of the frequency converter SO 3536 - 7M and of the pulse modulator 8.Presentation of the FUM program for computer control of an electric drive with asynchronous machine powered by a frequency converter 9. Computer operation of an electric drive with an asynchronous machine powered by a frequency converter 10. Closing the situation at the laboratory.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h 4 h 4 h 2 h 2 h 2 h 2 h 4 h 4 h 2 h

Bibliography

5. Silaghi H.,SpoialĂ V.,Costea C. - *Acţionări electrice* , Îndrumar de laborator, Lito Universitatea din Oradea, 2008
6. Viorica Spoială, Helga Silaghi, Dragoş Spoială – Acţionări electrice. Indrumator de laborator. Universitatea din Oradea, ISBN 978-606-10-1432-3, Ediţie CD-ROM, 140 pag, 2014

8.3 Academic project	Teaching methods	No. of hours/ Observations
Design of the lifting mechanism of a general purpose overhead crane	Students receive the project theme and design methodology and under the guidance of the teacher perform the project stages	14h

Bibliography

1. Silaghi Helga, Spoială Viorica, *Proiectarea acţionărilor electrice*, îndrumător de proiectare, Editura Universităţii din Oradea, 2009

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark

10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	20%
10.6 Project	Minimum required conditions for promotion (grade 6): going through the design stages, without deepening the calculations For 10: going through all the design stages, with the completion of the calculations and the electrical supply and control diagrams	**Oral presentation** Following the presentation of the project completed during the semester, each student receives a grade.	20%
10.6 Minimum performance standard: Course: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations (analytical and numerical) with physical quantities. Laboratory: Development and implementation of algorithms and automation structures based on electrical drives, microcontrollers, signal processors, PLCs, embedded systems, etc. by using the principles of project management			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject				**Electro-hydro-pneumatic equipments in automation**			
2.2 Holder of the subject				**Conf. PhD eng. Tiberiu Barabas**			
2.3 Holder of the academic laboratory/project				**Conf. PhD eng. Tiberiu Barabas**			
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**Vp**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**2/-**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academiclaboratory/project	**28/-**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 3 works can be recovered during the semester (25%); - The frequency at laboratory hours below 75% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C2.** Working with fundamental concepts of computer science, information technology and communications. **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Transversal skills	**CT2.** Identification of roles and responsibilities in a pluri specialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline has as objective the familiarization of the students from the specialization Automation and applied informatics, in a leading field of automation, with electro-hydraulic and electro-pneumatic equipment. Theoretical and practical knowledge of the research, design and use of electro-hydraulic and electro-pneumatic automation equipment and their applications is provided.
7.2 Specific objectives	• The course aims to present the theoretical elements related to the design and use of electro-hydraulic and electro-pneumatic automation equipment. • The lab familiarizes students with the practical applications of electro-pneumatic automation equipment.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Cap.1. PASIVE COMPONENTS OF ELECTRO-HYDRAULIC AUTOMATIZATION EQUIPMENT. Cap.2. ACTIVE COMPONENTS OF ELECTRO-HYDRAULIC AUTOMATIZATION EQUIPMENT. Cap.3. APPLICATIONS OF ELECTRO-HYDRAULIC AUTOMATIZATION EQUIPMENT. Case studies. Cap.4. PASSIVE COMPONENTS AND CIRCUITS OF PNEUMATIC AUTOMATIZATION EQUIPMENT. Cap.5. ACTIVE COMPONENTS OF ELECTRO-PNEUMATIC AUTOMATIZATION EQUIPMENT. Cap.6. APPLICATIONS OF ELECTROPNEUMATIC AUTOMATIZATION EQUIPMENT. Case studies.	Free exposure, with the presentation of the course with video projector, on the board or online	4h 4h 6h 4h 4h 6h

Bibliography

1. Barabas, T., Tripe, V. C., **Sisteme şi echipamente electro-hidro-pneumatice de automatizare. Aplicaţii**, Editura Univ.Oradea, 2003
2. Bălăşoiu, V., **Echipamente şi sisteme hidropneumatice de acţionare**, Lito. Universitatea Tehnică Timişoara, 1992
3. Cristea, P., **Echipamente hidraulice şi pneumatice de automatizare**, Curs, Lito. Institutul Politehnic Iaşi, 1986
4. Lazea, Gh., **Echipamente de automatizare pneumatice şi hidraulice**, Lito. Institutul Politehnic Cluj-napoca, 1986
5. Velescu, C., **Aparate şi echipamente hidraulice proporţionale**, Editura Mirton Timişoara, 2003

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
Laboratory work is carried out within an educational CIM system. The stations and stands with pneumatic and electro-pneumatic drive are studied.	Students receive laboratory papers at least one week in advance, study	

1. Presentation of the laboratory and the labor protection norms. 2. Study of the operation of the MINI-CIM2000 system 3. Study of semi-automatic operation of the pneumatic station PN2000. 4. Study of the operation of the MR pneumatic manipulator within the PN2800 station. 5. Study of the operation of the MP pneumatic manipulator within the PN2800 station. 6. Adjusting the speed of a linear pneumatic motor. 7. Study of the automatic and semi-automatic operation of the ST2000 station. 8. Study of the operation of the MP pneumatic manipulator within the ST2000 station. 9. Control of the execution elements within the FMS2101 manufacturing system. 10. Control of a linear pneumatic motor with Blue Earth microcomputer. 11. Closed loop control of the positioning motion of a linear pneumatic motor. 12. Study of hydraulic actuators. 13. Study of conventional signs for hydro-pneumatic symbolization. 14. Closing the situation at the laboratory.	them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h 2 h
Bibliography 1. Barabas, T., Tripe, V. C., **Sisteme şi echipamente electro-hidro-pneumatice de automatizare. Aplicaţii**, Editura Univ.Oradea, 2003		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, FaistMekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	70 %

10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	30%
10.6 Minimum performance standard: • Selection and use of electro-hydraulic and electro-pneumatic automation equipments.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Experimentally systems identification**					
2.2 Holder of the subject		**Lect. PhD eng. Costea Claudiu Raul**					
2.3 Holder of the academic seminar/laboratory/project		**Lect. PhD eng. Costea Claudiu Raul**					
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 laboratory	**2**
3.4 Total of hours from the curriculum	**56**	of which: 3.5 course	**28**	3.6 laboratory	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
Examinations	4
Other activities.	0

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	5

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Mathematical knowledge, estimation theory, data acquisition systems, programming.
4.2 related to skills	Measurement skills, data acquisition and computer programming.

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online.
5.2.for the development of the academic	- The laboratory can be carried out face to face or online. - Mandatory presence at all laboratories.

seminary/laboratory/project	- A maximum of 2 works can be recovered during the semester. - The frequency at laboratory hours below 70% leads to the restoration of the subject.

6. Specific skills acquired	
Professional skills	**C3**. Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques.
Transversal skills	**CT2**. Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ presentation of basic knowledge on techniques for estimating dynamic models based on experimental measurements; ▪ the usefulness of the models identified in solving the problems of control systems; ▪ acquire the skills necessary for process experimentation and developing the skills for processing sets of input-output measurements in order to develop models to be used in the design stage of algorithms for processes control; ▪ learning the model validation methods.
7.2 Specific objectives	▪

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction to system identification. 1.1. Concepts and definitions. 1.2. Identifying the problem of identification. 1.3. Identification methods. 1.4. Identification procedure. 1.5. The principle of model adjustment.	Free exposure, with the presentation of the course with video projector, on the board or online	4
2. Signals. 2.1. Signal classes. 2.2. Sampled signals. 2.3. Deterministic and stochastic signals. 2.4. The Laplace Transform. 2.5. The Z-transform. 2.6. The Discrete Fourier Transform. 2.7. The Fast Fourier Transform.	Free exposure, with the presentation of the course with video projector, on the board or online	4
3. Collection and processing of primary data 3.1. Data collection. 3.2. Data filtering.		2
4. Model classes. 4.1. Classification criteria for linear systems models.	Free exposure, with the	8

4.2. Non-parametric models. 4.3. Parametric models. 4.4. Structures of polynomial models of discrete stochastic systems. 4.5. Regression description of polynomial model structures. 4.6. Structure of models of the error equation. ARX models. ARMAX models.	presentation of the course with video projector, on the board or online	
5. Modeling and predicting time series. 5.1. Using Box-Jenkins methodology in time series modeling. 5.2. Choosing the structure and validating the model.	Free exposure, with the presentation of the course with video projector, on the board or online	4
6. Fundamentals of estimation theory. 6.1. Hypotheses and definitions. 6.2. Properties of the estimators. 6.3. Estimate using the method of least squares.		4
7. Synthesis of models used for systems identification.		2

Bibliography

1. C.R. Costea, *Identificarea experimentală a sistemelor – notiţe de curs*, în format electronic.
2. A. Bara, *Identificarea sistemelor,* Ed. U.T.Pres, Cluj Napoca, 193 pg, ISBN 973-9471-91-9, 2001.
3. M. Berger, *An introduction to probability and stochastic processes*, Springer-Verlag New York, 1993.
4. M. Dordescu, *Contribuţii la controlul automat al proceselor hidrodinami*ce, Ed. Matrix Rom, Bucureşti, ISBN 978-973-775-589-2, 186 pg, 2010.
5. D. Isoc, *Analiza, modelarea si identificarea sistemelor,* Ed. Mediamira, Cluj-Napoca, 2001.
6. L. Ljung, *System identification - Theory for the user;* Prentice-Hall, Inc., 1995.
7. S. Şerban, *Sisteme dinamice liniare. Aplicaţii numerice*, Ed. Printech, Bucureşti, 2001.
8. D.Ştefănoiu, J. Culiţă, P. Stoica, *Fundamentele modelării si identificării sistemelor,* Ed. Printech, Bucureşti, 2005.
9. M. Vânătoru, *Conducerea automată a proceselor industriale*, Vol. 1, Ed. Universitaria Craiova, 2001.

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Step response and frequency response analysis.	After the theoretical presentation of the laboratory work made by the teacher, the students carry out the practical part of the work under the guidance of the teacher.	2
2. First and second order systems analysis.		2
3. Identifying the time constant of the process by the tangent method.		2
4. Transformations of systems in representation domains.		2
5. Signal filtering.		2
6. Using System Identification Tool from Matlab.		2
7. Estimation and validation of parametric models.		2
8. Model testing using Simulink model.		2
9. Correlations and regressions.		2
10. The Box-Jenkins methodology used in modeling time series.		2
11. Descriptive statistics and statistical tests.		2
12. Parameter estimation using the Least Squares Method.		2
13. Estimators and confidence intervals.		2
14. Ending the situation at the laboratory.		2

Bibliography

1. C.R. Costea, *Identificarea experimentală a sistemelor – îndrumător de laborator*, Litografiat, 2016.
2. A. Bara, *Identificarea sistemelor,* Editura U.T.Pres, Cluj Napoca, 193 pg, ISBN 973-9471-91-9, 2001.
3. M. Dordescu, *Contribuţii la controlul automat al proceselor hidrodinamice*, Editura Matrix Rom, Bucureşti, ISBN 978-973-775-589-2, 186 pg, 2010.
4. S. Iliescu, C. Soare, I. Făgărăşan, P. Arsene, O. Niculescu, *Analiza şi sinteza sistemelor automate. Aplicaţii utilizând Matlab/Simulink***,** Ed. Printech, Bucureşti, ISBN 973-718-209-X, 107 pg., 2005.
5. D. Isoc, *Analiza, modelarea si identificarea sistemelor,* Editura Mediamira, Cluj-Napoca, 2001.
6. T. Popescu, *Serii de timp. Aplicaţii în analiza sistemelor,* Editura Tehnică, Bucureşti, 2000.
7. M. Vânătoru, *Conducerea automată a proceselor industriale*, Vol. 1, Editura Universitaria Craiova, 2001.
8. M. Vânătoru, E. Iancu, C. Maican, G. Cănureci, *Conducerea automată a proceselor industriale – îndrumător de laborator*, vol. 1, Editura Universitaria Craiova, 2007.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the subject can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited this specialization, and aims to establish a link between physical reality and systems theory.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - it is necessary to have 4 correct answers. For 10, it is necessary to have all correct answers.	**Written exam.** A test with 9 questions.	70%
10.5 Laboratory	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard – performing laboratory work with the data provided in each work. For 10, operating skills with the System Identification Toolbox from MATLAB and proving skills in resolving other identification problems than those exposed in the paper.	**Test + practical application**	30%
10.6 Project	-	-	-

10.7 Minimum performance standard:
Course:
- Knowledge of basic concepts and methods regarding the estimation techniques of dynamic models based on experimental measurements.
- Abilities to use the identified models in solving the problems of control systems.
- Acquire the skills necessary for process experimentation and developing the skills for processing sets of input-output measurements in order to develop models to be used in the design stage of algorithms for processes control.
- Learning model validation methods.
Laboratory:
- Abilities to use the identified models in solving the problems of control systems.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Control Systems Engineering and Management**
1.4 Field of study	**Control Systems Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**General economy**			
2.2 Holder of the subject				**Assoc.prof. PhD eng.ec. Liliana Doina Măgdoiu**			
2.3 Holder of the academic seminar/laboratory/project				**Lecturer PhD eng.ec. Zoltan Kovendi**			
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**
Distribution of time					69h
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- attending at least 50% of the course - the course can be held face to face or online
5.2.for the development of the academic seminar/laboratory/project	- mandatory presence at all seminar hours; - students come with observed seminar papers - a maximum of 3 seminars can be recovered during the semester (30%); - attendance at seminar hours below 70% leads to the restoration of the discipline - the seminar can be held face to face or online
6. Specific skills acquired	

Professional skills	**C6.** Apply knowledge of law, economics, marketing, business and quality assurance in the economic and managerial contexts.
Transversal skills	**TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Familiarization of students with the main types of processes and economic phenomena.
7.2 Specific objectives	▪ The course aims to present the theoretical elements of general economics ▪ The seminar acquaints the students with practical aspects regarding the economic-financial flows at business level, the management of the economic and financial phenomenon

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. The object of political economy	Free exposure, with the presentation on-line	2 h
Chapter 2. The legal character of the economy	Free exposure, with the presentation on-line	2 h
Chapter 3. The economic activity	Free exposure, with the presentation on-line	2 h
Chapter 4. Economic needs and interests	Free exposure, with the presentation on-line	2 h
Chapter 5. Company	Free exposure, with the presentation on-line	2 h
Chapter 6. Consumer behavior	Free exposure, with the presentation on-line	2 h
Chapter 7. Market	Free exposure, with the presentation on-line	2 h
Chapter 8. Economic competition	Free exposure, with the presentation on-line	2 h
Chapter 9. Selling prices	Free exposure,	2 h

	with the presentation on-line	
Chapter 10. Income, Consumption and the saving process	Free exposure, with the presentation on-line	2 h
Chapter 11. Economic growth	Free exposure, with the presentation on-line	2 h
Chapter 12. The profit of the entrepreneur	Free exposure, with the presentation on-line	2 h
Chapter 13. Cyclicality of economic activities	Free exposure, with the presentation on-line	2 h
Chapter 14. Relations with the international market	Free exposure, with the presentation on-line	2 h
Total		**28 h**

Bibliography

1. Rada, Ioan Constantin, **Economie**, Ed. Anotimp, 2002
2. Rada, Ioan Constantin; Rada, Ioana Carmen, **Economie. Caiet de lucrări**, Ed. Anotimp & Adsumus, 2002
3. Rada, Ioan Constantin; Bodog, Simona;Rada, Ioana Carmen; Lăzurean, Elena Nicoleta, **Economie generală, Marketing industrial (note de curs)**, Ed. Universităţii Oradea, 2006
4. Rada, Ioan Constantin; Bodog, Simona;Rada, Ioana Carmen; Lăzurean, Elena Nicoleta, **Economie generală, Marketing industrial (aplicaţii pentru seminar)**, Ed. Universităţii Oradea, 2006
5. Rada**,** Ioan Constantin, **Economie generală I**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2009,CD-ROM
6. Rada**,** Ioan Constantin, **Economie generală II**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2009,CD-ROM
7. Rada, Ioan Constantin, **Microeconomie. Idei moderne. Vol. I**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2007
8. Rada, Ioan Constantin, **Microeconomie. Idei moderne. Vol. II**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Paper: Consumer concepts 2. Report: About resources 3. Paper: The concept of competition 4. Paper: The role of the environment in obtaining production factors 5. Report: The information system of the enterprise 6. Paper: Substantiation of production cost decisions 7. Report: The production price and the profit of the entrepreneur	Students receive homework for the seminar papers or choose their homework at least a week in advance, study, design the papers and present them at the seminar. Appreciations and comments are made under the guidance of the teacher.	2 h 2 h 2 h 2 h 2 h 2 h 2 h
Total		**14 h**
Bibliography It is the one indicated for the course		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Automatics and Applied Informatics from other university centers that have accredited these specializations ("Politehnica" University of Timisoara, Technical University of Cluj-Napoca, Gh. Asachi Iasi, etc.), and knowledge the main types of processes and economic phenomena at microeconomic level, the theoretical elements of microeconomics and practical aspects regarding the economic-financial flows at business level, the management of economic and financial phenomenon is a stringent requirement of any employer in the field (Faist Mekatronics, Celestica, Comau, GMAB etc).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- for grade 5 it is necessary to know the fundamental notions required in the subjects, without presenting details on them - for grade 10, a thorough knowledge of all subjects is required	Written exam Students receive pre-arranged topics for solving	70%
10.5 Seminar	- for note 5, it is necessary to know the structure of the paper and one or two notions from the paper - for grade 10, the detailed knowledge of the issue and its support during the seminar	At each seminar, the students prepare a report, which can be collective, which they support and which is submitted to the debates during the seminars. Each student also receives a grade for the seminar activity during the semester	30%
10.6 Minimum performance standard: Course: - Solving and explaining problems of medium complexity, associated with the discipline of microeconomics or general economics, specific to the field of engineering and management - Participation in at least half of the courses. Seminar: - Designing economic-financial processes at business level, for a given situation - Participation in all seminar work.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject				**Linear Systems Control (IRA I)**			
2.2 Holder of the subject				**Lect. PhD Sanda Dale**			
2.3 Holder of the academic laboratory/project				**Lect. PhD Claudiu Costea**			
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academiclaboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	40
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	25
Tutorials	
Examinations	9
Other activities.	

3.7 Total of hours for individual study	**94**
3.9 Total of hours per semester	**150**
3.10 Number of credits	**6**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	- Mathematics - Linear Systems Theory
4.2 related to skills	Systems Modelling and Simuling , MATLAB environment

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	**C1.**Modern methods for analysis and design of control linear systems in time or frequency domain . **C2**.Analysis and design of control systems using MATLAB &Simulink environment. **C5.** Methods for control laws implementation.
Transversal skills	**TC1.** Analysis and design of Electrical , Mechanical, Thermal ,.., systems control **TC2.**Identify the roles and responsibilities of each member of a pluri-disciplinary team and apply efficient work and relational techniques inside the team.

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The main task of the course consists in learning of modern methods of analysis and design of linear control of dynamic systems
7.2 Specific objectives	• The course aims to present the theoretical and practical elements on control of linear systems. • The laboratory familiarizes students with practical aspects of analysis by control systems simulations using MATLAB&SIMULINK.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction in Control Systems 1.1. Closed-loop control versus open-loop control 1.2.Design and Compensation of Control Systems	Free exposure, with the presentation of the course with video projector, on the board or online	2h
2. Mathematical Modeling of Control Systems 2.1. Transfer function and Impulse-Response Function 2.2.Modeling in state-space	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h
3. Transient and Steady –State Response Analyses 3.1. First, second, higher- order systems 3.2. Routh's Stability Criterion 3.3. System Performances Defining	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h
4. Control Systems Analysis and Design by the Root-locus Method 4.1. Root-locus plots 4.2. Root-locus approach to control systems design 4.3. Lead, lag, lead-lag compensation	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h

5. Control Systems Analysis and Design by the Frequency-Response Methods 5.1 Bode and Polar diagrams 5.2 Nyquist stability criterion 5.3 Control systems design by Frequency-Response Methods 5.4 Lead, Lag, Lead-Lag Compensation	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h
6. PID Controllers and Modified PID Controllers	Free exposure, with the presentation of the course with video projector, on the board or online	2h
7 Control System Design in State Space 7.1 Controllability. Observability 7.2 Pole Placement Method 7.3 State Observers 7.4 Quadratic Optimal Control	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h
Bibliography 1. Ogata,K. Modern Control Engineering, Prentice Hall 2010 2. Dorf.,C.R , Bishop, H.R. –Modern Control Systems, Prentice-Hall, 1997 3. Bara, A., Ingineria Reglarii Automate		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1		2h
Bibliography 7.		
8.3 Academic project	Teaching methods	No. of hours/ Observations

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in	**Written exam** Students receive for solving each a form with	60 %

	accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	3 subjects of theory and an application.	
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	20%
10.6 Project	Minimum required conditions for promotion (grade 6):going through the design stages, without deepening the calculations For 10: going through all the design stages, with the completion of the calculations and the electrical supply and control diagrams	**Oral presentation** Following the presentation of the project completed during the semester, each student receives a grade.	20%
10.6 Minimum performance standard: Course:Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations (analytical and numerical) with physical quantities. Laboratory:Development and implementation of algorithms and automation structures based on electrical drives, microcontrollers, signal processors, PLCs, embedded systems, etc. by using the principles of project management The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology..			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics/ Bachelor in engineering**

2. Data related to the subject

2.1 Name of the subject		**Fuzzy Systems and Neural Networks**					
2.2 Holder of the subject		**Lecturer Phd. eng. Sanda DALE**					
2.3 Holder of the academic seminar/laboratory/project		**Lecturer Phd. eng. Sanda DALE**					
2.4 Year of study	**IV**	2.5 Semester	**8**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	-/1/-
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**
Distribution of time					56 h
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					2
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**98**
3.10 Number of credits	**6**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of algebra, mathematical analysis, computer programming, modeling and simulation, system theory, control engineering, MATLAB+SIMULINK
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- minimum 50% course attendance - the course can be held face-to-face or online
5.2.for the development of the academic seminary/laboratory/project	- The presence is mandatory at 6 from 7 labs - The recovery of 1 lab is possible during the semester - A portfolio with the results from all labs have to be completed at the end of the semester

6. Specific skills acquired

Professional skills	**C3.** Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques. **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working. **CT3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Students to acquire general knowledge, aptitudes and skills on using specific concepts in knowledge-based systems
7.2 Specific objectives	▪ The course has the aim to present the concepts related to specific concepts related to knowledge-based systems, their design methods and implementation ▪ During the lab, the students will get familiar with design methods of knowledge-based systems; students acquire operating skills on using FUZZY LOGIC şi NEURAL NETWORK from MATLAB+SIMULINK.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CAP 1. Introduction. Knowledge-based systems.	Free exposure, course presentation on video projector, on the board or online	2h
CAP 2. Fuzzy systems. Fuzzy logic elements. 2.1. Fuzzy sets 2.2. Operators on fuzzy sets 2.3. Modificators on fuzzy sets 2.4. Fuzzy logic. Modus-ponens principle. Composotional law of inference.		6h
CAP 3. Fuzzy control systems 3.1. Fuzzy modeling 3.2. Fuzzy identification principles 3.3. Fuzzy control. Fuzzy controllers structure. Mamdani and Sugeno controllers. Design principles for fuzzy controllers.		6h
CAP 4. Interpolative control systems based on rules 4.1. Interpolative reasoning 4.2. Approximation and interpolation 4.3. Using interpolative techniques in fuzzy structures 4.4. Interpolation and approximation techniques based on rules applied to process control		4h
CAP 5. Neural control systems. Fundaments of ANN 5.1. ANN attributes 5.2. ANN models 5.3. Learning algorithms for ANN 5.4. ANN Topologies 5.5. ANN Characteristics		4h
CAP 6. Paradigms or ANN architectures	Free exposure, course presentation on video projector, on the board or	2h
CAP 7. Aspects related to neural control 7.1. Modeling and identification based on ANN 7.2. Neural control		4h

	online	
Bibliography 1. **1. S. Dale**, *Sisteme fuzzy şi reţele neurale*, notiţe de curs in format electronic. 2. **S. Dale**, *Contribuţii la studiul sistemelor de conducere de tip interpolativ*, Ed. Politehnica, Timişoara, 2006. **3. K. Passino, S. Yurkovitch,** *Fuzzy Control*, Addison Wesley Longman, 1998. 4. **Al. Bara,** *Sisteme fuzzy - aplicaţii la conducerea proceselor*, Ed. UT. Pres, Cluj – Napoca, 2001. 5. **I.Dumitrache, N. Constantin, M. Drăgoicea**, *Reţele neuronale – Identificarea şi conducerea proceselor*, MatrixRom, Bucureşti, 1999.		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Knowledge reference frame description 2. Rule-basis and inference mechanism implementation 3. Mamdani fuzzy control system design for a positioning mechanism 4. Takagi-Sugeno fuzzy control system design for a nonlinear system 5. Interpolative control system design for a positioning mechanism 6. Direct-inverse neural control applied to position control of a suspension system (GT) 7. Direct-inverse neural control applied to position control of a suspension system (ST)	The students realize the practical part of the labs, guided by the teacher, using the didactic stands in the lab and computer-aided design.	2h 2h 2h 2h 2h 2h 2h
Bibliography 1. **S. Dale**, Sisteme fuzzy şi reţele neurale, fascicole de laborator, variantă electronică.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found also in the curriculum of Automatics and Applied Informatics from other academic centers with accreditation in this field (Universitatea ,,Politehnica" Timişoara, Universitatea Tehnică Cluj-Napoca, etc), and the knowledge of analysis and design methods specific to knowledge-based systems is a stringent requirement of the employers in the branch ((Plexus, Celestica, Comau, Continental etc).)

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard, without presenting details For 10: throughout knowledge of all subjects	**Written exam**: Students receive individually for solving 5 theoretical and applied topics. The evaluation can be done face to face or online.	70%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard: analysis and design for simple knowledge-based control systems using MATLAB+SIMULINK For 10: analysis and	**Lab tests and results presentations** Every lab will end with a result presentation and a test. All of these will be presented at the end and graded. The evaluation can be done face to face or online.	30%

	design for complex knowledge-based control systems using MATLAB+SIMULINK		
10.7 Project			
10.8 Minimum performance standard: Course: - Knowledge of specific issues related to knowledge-based system approach, design and implementation methods, at conceptual level - Ability to use the methods of analysis and design methods for knowledge-based systems for processes. Academic seminar: Laboratory: - Skills regarding: analysis and design for a knowledge-based system using computer-aided design methods and MATLAB+SIMULINK (FUZZY LOGIC and NEURAL NETWORKS TOOLBOX) - Ability to identify the situations in which is useful to introduce a knowledge-based control system Project:			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**Industrial informatic systems**			
2.2 Holder of the subject				**Lect. PhD eng. Costea Claudiu Raul**			
2.3 Holder of the academic seminar/laboratory/project				**Lect. PhD eng. Mesaros Diana Monica**			
2.4 Year of study	**IV**	2.5 Semester	**8**	2.6 Type of the evaluation	**Vp**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 laboratory	**2**
3.4 Total of hours from the curriculum	**56**	of which: 3.5 course	**28**	3.6 laboratory	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	3
Other activities.	2

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of object-oriented programming, knowledge of the principles of operation and programming of a microcontroller, programmable automaton and an industrial robot.
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	- The laboratory can be carried out face to face or online. - Mandatory presence at all laboratories. - A maximum of 2 works can be recovered during the semester. - The frequency at laboratory hours below 70% leads to the restoration of the subject.

6. Specific skills acquired	
Professional skills	**C3**. Using automation fundamentals, methods of modeling, simulation, identification and processes analysis, computer aided design techniques. **C5**. Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working. **CT3.** Identify training opportunities and efficient use of resources and learning techniques for their own development.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to present strategies, methods, techniques and tools for designing and implementing a computer system or application in connection with other technological, automation and computer disciplines. Both the theoretical and practical aspects of the implementation of informatics systems are presented.
7.2 Specific objectives	▪ Knowledge of methods for analyzing an information system in order to design an informatics system. ▪ Knowledge of the basic principles, stages and techniques of designing an informatics system. ▪ Learning techniques for implementing and operating information systems. ▪ Knowledge of methods for making documentation.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. General considerations regarding informatics applications.	Free exposure, with the presentation of the course with video projector, on the board or online	2
2. General principles to create informatics systems. 2.1. Stages to create informatics systems. 2.2. Stages to create the program-products. 2.3. Aspects regarding the evolution of an informatics system.		2
3. The technology to create an informatics product. 3.1. General considerations. 3.2. Informatics systems modeling. 3.3. Features of informatics products. 3.4. Strategies for designing and implementing an informatics system.		2
3.5. Techniques for creating an informatics product. 3.6. Methods for creating an informatic product.		2
4. The technological framework for the realization and maintenance of informatics systems. 4.1. Elaboration of the realization theme. 4.2. Standards used in the analysis and design of informatics systems.		2
4.3. Overall system design. 4.4. System analysis.		2
5. Computer modeling of processes. 5.1. Organizing a flow of activities.		2
5.2. Activity flow modeling.		2
5.3. Petri net modeling.		2

5.4. Mapping concepts in Petri nets.		2
5.5. Workflow management.		2
5.6. Analysis of data flows and activities.		2
5.7. Functions and architecture of a system of activity flows.		2
6. Design and implementation of SCADA applications.		2

Bibliography

1. Claudiu Raul Costea, „Controlul proceselor cu aplicaţii la fabricarea cimentului”, Editura Universităţii din Oradea, ISBN 978-606-10-1475-0, 2015.
2. Adina Cretan, „Analiza si proiectarea sistemelor informatice”, Editura Pro Universitaria, 2013.
3. Ioana Fagărăşan, Analiza si proiectarea sistemelor informatice industriale – suport de curs, 2016.
4. Daniela Hossu, Ioana Făgărăşan, Andrei Hossu, „Proiectarea aplicaţiilor SCADA – Studii de caz”, Editura Printech, Bucureşti 2013.
5. Daniela Hossu, Ioana Făgărăşan, Iulia Dumitru, Nicoleta Arghira, Sergiu Stelian Iliescu, „Ghid practic de proiectare si implementare a aplicaţiilor SCADA”, Editura Conspress, Bucureşti 2013.
6. Sergiu Stelian Iliescu, Patricia Arsene, Ioana Făgărăşan, Dan Pupăză, „Analiza de sistem în informatica industrială”, Editura AGIR, Bucureşti 2006.
7. T. Jucan, F.L. Ţiplea, „Reţele Petri. Teorie si practică”, Editura Academiei Române, Bucureşti, 1999.
8. D. Oprea, G. Meşniţă, F. Dumitriu, Analiza sistemelor informaţionale, suport curs, Iaşi, 2016.
9. Octavian Păstrăvanu, Mihaela Matcovschi, Cristian Mahulea, „Aplicaţii ale Reţelelor Petri în studierea sistemelor cu evenimente discrete”, Editura Gh. Asachi, 2002.
10. Gh. Sebestyen, „Informatica industrială”, Ed. Albastră, Cluj -Napoca, 2006.

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, labor protection norms, structure of principle and working regimes for the flexible manufacturing system CIM 2000.	After the theoretical presentation of the laboratory work made by the teacher, the students carry out the practical part of the work under the guidance of the teacher.	2
2. Soft control of the CIM-2000 system. System tasks. Operator interface.		2
3. The structure of the CIM-2000 communication network.		2
4. Central computer. Main-Control program.		2
5. Command and control program of the PN-2800 pneumatic station.		2
6. Command and control program of the ST-2000 automatic warehouse. Strategies of occupying.		2
7. Command and control program of the Vision 2000 station.		2
8. Facilities for software processing of the image of the test piece within the Vision 2000 station.		2
9. Slide motion control program of the RV-M1 robot.		2
10. NCL-2000 lathe control program.		2
11. Modeling using Petri nets.		2
12. Simulation of Petri nets using the Petri Nets Simulator application.		2
13. Design of a human-machine interface for the water pumping process.		2
14. Ending the situation at the laboratory.		2

Bibliography

1. Claudiu Raul Costea, „Controlul proceselor cu aplicaţii la fabricarea cimentului”, Editura Universităţii din Oradea, ISBN 978-606-10-1475-0, 2015.
2. C.R. Costea, H. Silaghi, L. Matica, E. Gergely, G. Husi, L. Coroiu, „Graphical Interface Design for Water Pumping Process which Works with a Hydrophore”, The Scientific Bulletin of Electrical Engineering Faculty, Year 16, No. 1 (33), ISSN (Print) 1843-6188, ISSN (Online) 2286-2455, November 2016.
3. A. Cretan, „Analiza si proiectarea sistemelor informatice”, Editura Pro Universitaria, 2013.
4. C. Girault, R. Valk, „ Petri Nets for Systems Engineering. A Guide to Modelling, Verification, and Applications”, Springer-Verlag, 2001.
4. L.M. Matica, „Informatica de proces – îndrumător de laborator”, Editura Universităţii din Oradea, 1996.
5. L.M. Matica, A. Abrudan-Purece, „Sisteme distribuite în automatizări complexe – îndrumător de laborator”, Editura Universităţii din Oradea, 2006.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the subject can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited this specialization, for example Universitatea Politehnica Timişoara. The operation and programming exercises are considered to be some of the most useful, in order to adapt with the industrial environment and for a faster integration in production.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard – it is necessary to know the basic notions required for three of the five topics, without presenting details on them. - For 10, it is necessary to have a thorough knowledge of all topics and the correct solution of the application.	**Written exam.** Students receive five topics to solve, of which two are applications.	70%
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - it is necessary to know the applications used to perform laboratory work, without presenting details about them. - For 10, it is necessary the detailed knowledge of the way of concrete implementation of all the applications targeted by each laboratory work.	**Test + practical application.** Students receive tests and a grade on each test. Also, each student receives a grade for the current activity during the semester and for the file with the laboratory works. Thus, an average is obtained for the activity related to the laboratory works.	30%
10.6 Project	-	-	-

10.7 Minimum performance standard:

Course:

- Ability to describe the general principles of computer systems.
- Ability to present the technology to create a software product.
- Ability to modeling processes.
- Design and construction of Petri nets.
- Using scientific, engineering and computer systems concepts and methods.
- Solving problems using the tools of science and systems engineering.
- Evaluating and improving the performance of informatics systems.
- Analysis, design and implementation of informatics systems.

Laboratory:

- The ability to describe the principles of automatic processing (at the central station, the pneumatic station, the automatic warehouse, the flexible processing station with Mitsubshi industrial robot, the automatic lathe and at the quality control station) within the flexible manufacturing system CIM 2000.

- Ability to describe the differences between manual and automatic operating mode for flexible manufacturing systems.
- Design, life cycle management, integration and integrity of informatics systems.
- Knowledge of the principles of informatics systems design.
- Design, modeling and simulation of Petri nets.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject			**Industrial robots control**				
2.2 Holder of the subject			**Conf. PhD eng. Tiberiu Barabas**				
2.3 Holder of the academic laboratory/project			**Lect. PhD eng. Zoltan Kovendi**				
2.4 Year of study	**IV**	2.5 Semester	**8**	2.6 Type of the evaluation	**Vp**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1/1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academiclaboratory/project	**14/14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	18
Tutorials	
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering. **C4.** Design, implementation, testing, use and maintenance of general-purpose systems and dedicated equipment, included computer networks for automation and applied informatics applications. **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Transversal skills	**CT2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working. **CT3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The discipline has as objective the familiarization of the students from the specialization Automation and applied informatics, with methods of motion control at the industrial robots, as well as methodologies of design and generation of trajectories.
7.2 Specific objectives	• The course aims to define the general problems related to the controlling of robots, to review the main kinematic calculations used in the control of robots (direct and reverse kinematics) as well as to study the different methods of control the industrial robots (control in Joint coordinates, control in Cartesian coordinates, etc.). • The laboratory familiarizes students with the basic kinematic calculations used in the control of the robots, with the computer implementation of the various basic methods related to the generation of trajectory. • The project proposes the individual implementation of the knowledge provided in the course, in a computer application, related to the control of an industrial robot.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Cap.1. The problem of the control of an industrial robot. Cap.2. The main kinematic calculations used in the control of the industrial robots. Cap.3. Control of robot motions in Joint coordinates. Cap.4. Control of robot motions in Cartesian coordinates. Cap.5. Control of robot motions in the Cartesian space with orientation in Joint coordinates.	Free exposure, with the presentation of the course with video projector, on the board or online	4h 6h 6h 6h 6h
Bibliography 9. T., Barabas, T., Vesselenyi, **Robotică – Conducerea şi programarea roboţilor industriali – Probleme şi metode de bază**, Editura Universităţii din Oradea, 2004 10. T., Vesselenyi, T., Barabas, **Comanda roboţilor. Aplicaţii**, Editura Universităţii Oradea, 2006; 11. B., Lantos, **Robotok Irányitása**, Akademiai Kiado, Budapest, 1991 12. Lăcrămioara Stoicu -Tivadar, **Programarea roboţilor industriali şi a maşinilor unelte cu comandă numerică** - *curs*, Universitatea "Politehnică" Timişoara, 1996 13. John J.Craig – Introduction to Robotics (Mechanics and Control) – CRC Press 2005		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory and of the labor protection norms.	Students receive laboratory papers at least one week	2 h

2. Direct kinematic calculation used in robot control. 3. Reverse kinematic calculation used in robot control. 4. Generating the trajectory of industrial robots with polynomial driving functions of 3 degree. 5. Generating the trajectory of industrial robots with polynomial driving functions of 5 degree. 6. Generating the trajectory of industrial robots with driving functions with trapezoidal speed profile. 7. Closing the situation at the laboratory.	in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h 2 h 2 h 2 h 2 h 2 h
Bibliography 8. T., Barabas, **Conducerea roboţilor industriali**, Îndrumător de laborator, Universitatea din Oradea, 2005		
8.3 Academic project	Teaching methods	No. of hours/ Observations
Within the project, a computer application related to robot control is carried out by implementing the method of generating the trajectory with driving functions of the 5 degree, for an industrial robot of type: TTTRRR, TRTRRR, RTTRRR, TTRRRR, RRRRRR, TRRRR, TRRRR, RTRRRR or RRRRRR.	Students receive the project theme and design methodology and under the guidance of the teacher perform the project stages	14h
Bibliography 1. M. Gavriş, T. Barabas, **Comanda, conducerea şi programarea roboţilor** – Îndrumător de proiect, Universitatea Oradea, 1996.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, FaistMekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	60 % (6 points out of 10)
10.5 Laboratory	Minimum required conditions for promotion	**Test + practical application**	20% (2 points out of 10)

	(grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	
10.6 Project	Minimum required conditions for promotion (grade 6):going through the design stages, without deepening the calculations For 10: going through all the design stages, with the completion of the calculations and the program implementation.	**Oral presentation** Following the presentation of the project completed during the semester, each student receives a grade.	20% (2 points out of 10)
10.6 Minimum performance standard: 5 points out of 10.			

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Datarelated to thesubject

2.1 Name of the subject		**Optimal and Adaptive Control Systems**					
2.2 Holder of the subject		**PhD Adrian Codoban**					
2.3 Holder of the academic laboratory/project		**PhD Adrian Codoban**					
2.4 Year of study	**IV**	2.5 Semester	**7**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**2/0**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**28/0**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	40
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	25
Tutorials	
Examinations	9
Other activities.	

3.7 Total of hours for individual study	**94**
3.9 Total of hours per semester	**164**
3.10 Number of credits	**6**

4. Pre-requisites(where applicable)

4.1 related to the curriculum	- Mathematics - Linear Systems Theory
4.2 related to skills	Systems Modelling and Simuling , MATLAB environment

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory/project can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C1.**Modern methods for analysis and design of optimal and adaptive control systems in time or frequency domain . **C2**.Analysis and design of control systems using MATLAB &Simulink environment. **C5.** Methods for control laws implementation.
Transversal skills	**TC1.** Analysis and design of Electrical , Mechanical, Thermal ,.., systems control **TC2.**Identify the roles and responsibilities of each member of a pluri-disciplinary team and apply efficient work and relational techniques inside the team.

7. The objectives of the discipline(resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• The main task of the course consists in learning of modern methods of analysis and design of nonlinear control of dynamic systems
7.2 Specific objectives	• The course aims to present the theoretical and practical elements on control of nonlinear systems. • The laboratory familiarizes students with practical aspects of analysis by control systems simulations using MATLAB&SIMULINK.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction to Mathematical Optimal Control Theory 1.1. Introduction 1.2.Controllability , bang-bang principle 1.3 Linear time-optimal control 1.4 Euler Lagrange Equation 1.5 Solutions of Euler Lagrange Equation 1.6 The Pontryagin Maximum Principle 1.7 Introduction to Stochastic Control Theory	Free exposure, with the presentation of the course with video projector, on the board or online	14h
2. Adaptive Control 2.1. Stability Problems 2.2. On-line Parameters Estimation 2.3 Model Reference Adaptive Control 2.3.1 Simple Direct MRAC Schemes 2.3.2 MRC for SISO Plants 2.4 Indirect MRAC 2.6 Adaptive Pole Placement Control	Free exposure, with the presentation of the course with video projector, on the board or online	14h

Bibliography

4. Evans, L. An Introduction to Mathematical Optimal Control Theory,University of California, Berkeley
5. Robust Adaptive Control
6. Bara, A., Ingineria Reglarii Automate

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
		28h
Bibliography 9.		
8.3 Academic project	Teaching methods	No. of hours/ Observations
		14h

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10:thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	20%
10.6 Project	Minimum required conditions for promotion (grade 6):going through	**Oral presentation** Following the presentation of the	20%

	the design stages, without deepening the calculations For 10: going through all the design stages, with the completion of the calculations and the electrical supply and control diagrams	project completed during the semester, each student receives a grade.	

10.6 Minimum performance standard:
Course:Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations (analytical and numerical) with physical quantities.
Laboratory:Development and implementation of algorithms and automation structures based on electrical drives, microcontrollers, signal processors, PLCs, embedded systems, etc. by using the principles of project management
The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.
Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.
Elaboration and argumentative support of the application of a personal professional development plan.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Automatics and Applied Informatics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**Process Interfaces**			
2.2 Holder of the subject				**Prof.univ.dr.ing. Gabriela Tonţ**			
2.3 Holder of the academic laboratory/project				**Prof.univ.dr.ing. Gabriela Tonţ**			
2.4 Year of study	**IV**	2.5 Semester	**7**	2.6 Type of the evaluation	**Vp**	2.7 Subject regime	**O**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic laboratory/project	**14**

Distribution of time	42ore
Study using the manual, course support, bibliography and handwritten notes	16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**42**
3.9 Total of hours per semester	**84**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	- Mandatory presence at all laboratories; - The laboratory can be carried out face to face or online - Students come with the observed laboratory works - A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	**C1.** Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering **C5.** Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems
Transversal skills	**TC2.** Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working **TC3.** Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The main objective is to acquire general knowledge, skills and abilities related to the process interfaces used with personal computers, both in terms of hardware and software.
7.2 Specific objectives	The course aims to present specific concepts related to process interfaces, both as hardware structures, as a way to connect them to the computer, and software, as a user interface During the laboratory activity, students become familiar with the use of hardware interfaces (data acquisition and generation devices), and software (user interface) using the LabVIEw graphical application development environment of National Instruments and PCI data acquisition cards. -MIO-16E-4.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. CHAPTER.1. Introductory notions of process interfaces 1. Numerical processing systems 1.1.1. Common elements of numerical processing systems 1.1.2. Advantages of computer - based numerical processing systems 2. Introduction to the LabVIEW application development environment 3. Notions of measurement and data acquisition 1.3.1. signals acquired from the process 1.3.2. signals generated to the process 4. LabVIEW Configuration Utility: MAX (Measurement and Automation eXplorer) 1.4.1. physical channel, virtual channel and configuration of virtual channels with MAX 1.4.2. Test panels of a data acquisition device	Free exposure, with the presentation of the course with video projector, on the board or online	2h 4h 2h 4h
CHAPTER.2. The structure of a process interface 2.1. Types of signal conditioning 2.2. Correlation of the operation of sampling and storage circuits and analog-to-digital converters 2.3. Digital-to-analog converters 2.4. Analog outputs of data acquisition devices. 2.5. Analog to digital converters 2.6. Analog inputs of data acquisition devices 2.7. Types of signal sources and connections for signals	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h 2h 2h

CHAPTER.3. Computer ports and buses used for communication with data acquisition devices 3.1. Classification of the ways of coupling the process interfaces to the PC 3.2. PCI and PCI Express bus 3.3. SAD coupling on the RS232 serial interface and its variants. 3.4. USB port. 3.5. LabVIEW VISA features 3.6. Parallel computer port 3.7. GPIB interface	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h 2h

Bibliografie

[1]. **Gabriela Tont**, *Interfețe de proces, curs pentru uzul studentilor,* Editura Universitatii din Oradea. 2018

[2]. **L. Toma**, *Sisteme de achiziție și prelucrare numerică a semnalelor*, Ed. de Vest, Timişoara, 1997.

[3]. **C. Şorândaru,** *Instrumentație virtuală în ingineria electrică*, Editura Orizonturi universitare, Timișoara, 2003.

[4]. **T. Ozkul,** *Data Aquisition and Process Control Using Personal Computers*, Marcel Dekker Inc., Teknomed Engineering, Istanbul, Turkey, 1996.

[5]. ***, *LabVIEW Fundamentals*, Manual National InstrumentsAugust 2007.

[6]. **INOR Intelligence**, *Signal Conditioning*, Catalog and Specifier s Guide 1998-99.

[7]. ***, *I-7000 Bus Converter User s Manual*, version1.6, feb 2005, 7PH-006-10

[8]. ***, *LabVIEW Core 1, Course Manual*, course software version 2009, october 2009 Edition.

[9]. ***, *LabVIEW Core 1, Exercises*, course software version 2009, october 2009 Edition.

[10]. **Ionescu &Ionescu s.a.**, *Automatica de la A la Z,*

[11]. **V. Maier, C.D. Maier,** *LabVIEW in calitatea energiei electrice,* Editura Albastră, Cluj-Napoca, 2000

[12]. **Tiberiu S. Leția,** *Sisteme de timp real,* Editura Albastră, Cluj-Napoca, 2000

[13]. **Dennis S. Bernstein, Jacob Apkarian,** *Experiments for Control research, pgs10-13,* in Control System Magazine, IEEE, october 2003, volume 23, number 5.

[14]. **N. Ionescu-Cruțan**, *Dicționar de calculatoare englez-român,* Editura Niculescu, București, 1999.

[15]. ***, DAQ E Series User Manual,

[16]. http://digital.ni.com/manuals.nsf/websearch/1A2B0F3938B5B895086257B, Edition Date: February 2007, Part Number: 370503K-01

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Study with LabVIEW virtual tools 2. Customizing an IV 3. Analysis and saving of a signal, complete and professional 4. LabVIEW MAX Utility. Simulation of data acquisition devices. Test panels of a data acquisition device. PCI-MIO-16E-4 data acquisition device application 5. Analog inputs of the PCI-MIO-16E-4. Differential configuration of analog signals. Acquisition of voltage signals from floating sources. Signal conditioning by isolation and attenuation 6. PCI-MIO-16E-4 analog outputs. Generation of voltage signals. Analysis of a process for establishing the signals to be acquired and generated. 7. Driving an open loop DC motor.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2h 2h 2h 2h 2h 2h 2 h

Bibliography

10. Gabriela Tont, *Interfețe de proces, Indrumator de laborator*, Editura Universitatii din Oradea. 2018

11. LabVIEW Getting Started manual, ediţiile pentru LabVIEW 7.1, 8.5, 8.6 şi2011
12. Baza de exemple LabVIEW
13. LabVIEW Help, manualele pentru versiunile 7.1, 8.5, 8.6, 2010 şi 2011 ale LabVIEW.
14. Introduction to LabVIEW, Six-Hour Course, http://www.ni.com/white-paper/5241/en/

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline can be found in the curriculum of Automatics and Applied Informatics and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of electric drives and their operation and design is a stringent requirement of employers in the field (Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): -for note 5, identification of the elements corresponding to a virtual tool, establishment of the necessary for the practical realization of an application for acquisition and generation of data using a set of personal computer, DAQ device and the development environment of graphic applications LabVIEW - for note 10, the establishment of the necessary functions for the realization of the virtual tools for the proposed applications, which will run and will fulfill the set objectives.	**Test + practical application** At each laboratory students receive a test and a grade. Each student also receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	40%

	Laboratory reports and tests The purpose of each laboratory work is a report that includes the results obtained during the work. All of them are the laboratory notebook that is taught at the end of the semester and evaluated. 30%		

10.6 Minimum performance standard:
Course: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations (analytical and numerical) with physical quantities.
Laboratory: - Development of skills regarding: using the basic programming elements of LabVIEW, knowing how to use and the structure of a data acquisition equipment based on personal computer and data acquisition device for the PCI bus;
- Ability to develop small application programs.The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.
Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.
Elaboration and argumentative support of the application of a personal professional development plan.

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
1.4 Field of study	Control Systems Engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Applied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Numerical Methods					
2.2 Holder of the subject		Lecturer PhD eng. **Novac Cornelia Mihaela**					
2.3 Holder of the academic seminar/laboratory/project		Lecturer PhD eng. **Novac Cornelia Mihaela**					
2.4 Year of study	2	2.5 Semester	3	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	DF

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic laboratory	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					44hours
Study using the manual, course support, bibliography and handwritten notes					16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -Computer skills, linear algebra and mathematical analysis
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	- The course room has to be provided with a video-projector - The course can be carried out face to face or online

5.2.for the development of the academic seminary/laboratory/project	- Personal computers with dedicated software programs (Matlab); - Students presence to all laboratory hours is compulsory - The laboratory hours can be carried out face to face or online

6. Specific skills acquired	
Professional skills	***C1.*** *Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering.* ***C2.*** *Working with fundamental concepts of computer science, information technology and communications.*
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline "Numerical methods" aims to familiarize students with the features of the basic principles of numerical methods; the practical interpretation of the formulas from the methods presented with the help of a computer system and the realization of some computer programs with applications in the field of Systems Engineering, written in the Matlab programming language.
7.2 Specific objectives	After completing the discipline "Numerical methods", students acquire the following skills: ▪ Understanding the content and essence of laboratory work; ▪ Application of numerical problems in the field of systems engineering ▪ Using the Matlab programming language for numerical calculation in the field of systems engineering;Solving with the help of a calculation system the more complex engineering problems, for which the analytical solutions do not exist, or are unsatisfactory. ▪ Acquiring the ability to use what they have learned in this discipline in the case of a rigorous and abstract approach to practical problems that may arise in further research (master's, doctorate).

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Matlab programming fundamentals	Interactive lecture + video projector / Online	2
2. Introduction in Matlab programming	Interactive lecture + video projector / Online	4
3. Errors in numerical calculation	Interactive lecture + video projector / Online	2
4. Numerical methods to solve algebric linear systems equations. Exact methods.	Interactive lecture + video projector / Online	2
5. Numerical methods to solve algebric linear systems equations. Iterative methods.	Interactive lecture + video projector / Online	2
6. Interpolation.	Interactive lecture + video projector / Online	4
7. Functions approximation	Interactive lecture +	2

	video projector / Online	
8. Numerical methods to solve nonlinear equations.	Interactive lecture + video projector / Online	2
9. Numerical derivation	Interactive lecture + video projector / Online	2
10. Numerical integration	Interactive lecture + video projector / Online	4
11. Numerical methods to solve differential equations	Interactive lecture + video projector / Online	2

Bibliography

1. Mihaela Novac-" Metode numerice", Editura Universităţii din Oradea, 2005.
2. Mihaela Novac - Metode numerice utilizând MatLAB : pentru ingineri- Editura Universităţii din Oradea, 2014.
3. Mihaela Novac - "Metode numerice îndrumător de laborator", Editura Universităţii din Oradea, 2012.
4. M. Ghinea, V. Fireţeanu, - " Matlab calculul numeric-grafică-aplicaţii.", Editura Teora, 1997.
5. I.A Viorel,D. M. Ivan – "Metode numerice cu aplicaţii în ingineria electrică", Editura Universităţii din Oradea, 2000.
6. Rusu, I-"Metode numerice în electronică", Editura Tehnică Bucureşti, 1997
7. Mihaela Novac-" Metode numerice utilizând Matlab pentru ingineri", Editura Universităţii din Oradea, 2014

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Using the Matlab programming environment	Application programs using Matlab	2
2. Build function files in Matlab	Application programs using Matlab	2
3. Using the Matlab graphics environment. Building 2D and 3D graphics.	Application programs using Matlab	2
4. Programs for solving algebric linear systems equations. Exact methods.	Application programs using Matlab	4
5. Programs for solving algebric linear systems equations. Iterative methods	Application programs using Matlab	2
6. Matlab programs for polynomial interpolation	Application programs using Matlab	2
7. Functions approximation. Matlab programs for linear regression and polynomial regression.	Application programs using Matlab	4
8. Matlab programs for solving nonlinear equations	Application programs using Matlab	2
9. Matlab programs for solving numerical derivation	Application programs using Matlab	2
10. Matlab programs for solving numerical integration	Application programs using Matlab	2
11. Matlab programs for solving differential equations	Application programs using Matlab	2
12. Evaluation of laboratory activity.		2

Bibliography

1. Mihaela Novac-" Metode numerice", Editura Universităţii din Oradea, 2005.
2. Mihaela Novac, O. Novac - "Metode numerice utilizând Matlab", Editura Universităţii din Oradea, 2003.
3. Mihaela Novac - "Metode numerice îndrumător de laborator", Editura Universităţii din Oradea, 2012.

4. M. Ghinea, V. Fireţeanu, - " Matlab calculul numeric-grafică-aplicaţii.", Editura Teora, 1997.
5. I.A Viorel,D. M. Ivan – "Metode numerice cu aplicaţii în ingineria electrică", Editura Universităţii din Oradea, 2000.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields..

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- Knowledge and proper use of notions specific to numerical calculation;	Continuous Assessment, practical computer applications / Online assessment (Online questionnaire)	70 %
10.6 Laboratory	- Realization of all laboratory applications	Practical application	30%
10.8 Minimum performance standard: -			

Completion date:
29.08.2022

Date of endorsement in the department:
1.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
1.4 Field of study	Systems engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Applied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Control systems informatics					
2.2 Holder of the subject		Assoc. prof. GERGELY Eugen-Ioan					
2.3 Holder of the academic seminar/laboratory/project		Lecturer KOVENDI Zoltan / Assoc. prof. BARABAS Tiberiu					
2.4 Year of study	4	2.5 Semester	8	2.6 Type of the evaluation	Examination	2.7 Subject regime	Specialized Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	5	of which: 3.2 course	3	3.3 academic seminar/laboratory/project	-/1/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	42	3.6 academic seminar/laboratory/project	-/14/14

Distribution of time	60 hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**60**
3.9 Total of hours per semester	**130**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	- The course room has to be provided with a video-projector - The course can be carried out face to face or online
5.2.for the development of the laboratory/project	- The laboratory/project facility has to be provided with the necessary equipments - Students presence to all laboratory/project hours is compulsory - Students must have summarized the current laboratory work

	- Maximum 2 laboratory works (30%) can be recovered during the semester - A participation below 70% at the laboratory works / project leads to the restoration of the subject - Each student will receive a project specification - Students have to accomodate with the rhythm of elaboration and writing of the project - Students have to provide and to defend their project - The laboratory / project hours can be carried out face to face or online

6. Specific skills acquired	
Professional skills	C4. Design, implementation, testing, use and maintenance of general-purpose systems and dedicated equipment, included computer networks for automation and applied informatics applications. C5. Application development and implementation of algorithms and automatic management structures, using the principles of project management, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers, embedded systems.
Transversal skills	CT1. Application, in the context of legislative compliance, of intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of professional ethics code in their own strategies for rigorous, efficient and accountable work. CT2. Identification of roles and responsibilities in a plurispecialized team, making decisions and assigning tasks, applying techniques of effective relationships and team working. CT3. Identify training opportunities and efficient use of resources and learning techniques for their own development

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Students are introduced to the concepts needed to design numerical control systems (PLC and CNC). For this purpose, aspects related to interface with analog signals, communications, human-machine interface, operational safety, construction notes, maintenance and troubleshooting are addressed. The laboratory is focused on the CP 20 UO machining center. The project will design an NC program for machining a part (individual theme) on a CNC router type 3018PRO
7.2 Specific objectives	▪ Creating the ability to analyze, design, implement and troubleshoot process control systems. ▪ Acquiring the ability to interconnect different control equipments in industrial networks. ▪ Gaining the ability to design human-machine interfaces.

8. Contents*

8.1 Course	Teaching methods face to face or online	No. of hours/ Observations
1. Analog signals, closed loop control and intelligent modules	interactive presentation	9 hours
2. Distributed systems	interactive presentation	9 hours
3. Human-machine interface	interactive presentation	6 hours
4. Practical aspects	interactive presentation	18 hours

Bibliography

1. E. Gergely, Informatica sistemelor de conducere, Note de curs, format electronic, 2018.
2. E. Gergely, Helga Silaghi, V. Spoială**,** L. Coroiu, Z. Nagy, Automate programabile. Operare, programare, aplicaţii, Editura Universităţii din Oradea, Oradea, ISBN 978-973-759-940-7, 2009.
3. L. M. Thompson, Industrial Data Communications, 4th Edition, ISA, 2007.

8.2 Laboratory	Teaching methods face to face or	No. of hours/ Observations

	online	
1. Labor protection. Presentation of laboratory works.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
2. Study of the CP20UO processing center.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
3. The CNC 600 equipment. Conventional operation.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
4. The CNC 600 equipment. Numerical control operation.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
5. Programming contour processing using the tool compensation functions of the CNC 600 equipment.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
6. Functions and structure of the CNC 600-3 system.	Laboratory work summary and practical demonstrations using specific equipments	2 hours
7. Completion of the laboratories situation	Laboratory work summary and practical demonstrations using specific equipments	2 hours
Bibliography 1. Nagy Z., ş.a., Informatica sistemelor de conducere, îndrumător de laborator, Editura Universităţii din Oradea, 2004. 2. R. Zurawski, Integration Technologies for Industrial Automated Systems, CRC Press, USA, 2007.		
8.3 Project	Teaching methods	No. of hours/ Observations
1. Presentation of the topic and explanations on how to carry out and prepare the project.	Interactive presentation, examples, individual work	2 hours
2. The drawing of the piece with the representation of the tool trajectory.	Interactive presentation, examples, individual work	2 hours
3. Establishing the commands related to the trajectory.	Interactive presentation, examples, individual work	2 hours
4. Calculation of the coordinates of the characteristic points.	Interactive presentation,	2 hours

	examples, individual work	
5. Establishment of functions G, F, S, T and M.	Interactive presentation, examples, individual work	4 hours
6. Realization and testing of the NC program.	Interactive presentation, examples, individual work	2 hours
7. Project delivering and defending.	Interactive presentation, examples, individual work	2 hours

Bibliography

1. T. Barabas, Programarea maşinilor-unelte cu comandă numerică. Îndrumător de proiect, Universitatea din Oradea, 2020 (în format electronic).
2. T. Vesselenyi, T. Barabas, Robot and CNC programming, Editura Universităţii din Debrecen (HU), ISBN 978-963-473-522-9, 2012.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be made face to face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard -For mark 10: -thorough knowledge regarding analog signals, closed loop control and intelligent modules -thorough knowledge regarding distributed systems -thorough knowledge regarding human-machine interfaces -thorough knowledge regarding practical aspects	Written examination	60%
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	Knowledge assessment test	20%

	-For mark 10: - thorough knowledge regarding the CP20UO processing center - thorough knowledge regarding the structure and programming of the CNC 600-3 system		
10.7 Project	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard -For mark 10: - thorough knowledge regarding the commands for establishing the tool trajectory - thorough knowledge regarding the realization and testing of the NC program	Project completion and defending	20%
10.8 Minimum performance standard: Course: - knowledge regarding analog signals, closed loop control and intelligent modules - knowledge regarding distributed systems - knowledge regarding human-machine interfaces Laboratory: - knowledge regarding the CP20UO processing center - knowledge regarding the structure and programming of the CNC 600-3 system Project: - knowledge regarding the commands for establishing the tool trajectory - knowledge regarding the realization of the NC program			

Completion date:
01.09.2022

Date of endorsement in the department:
12.09.2022

Date of endorsement in the Faculty Board:
23.09.2022