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				**THEORY OF PROBABILITY AND MATHEMATICAL STATISTICS**			
2.2 Holder of the subject				As. Prof. PhD eng. **Novac Ovidiu-Constantin**			
2.3 Holder of the academic seminar/laboratory/project				As. Prof. PhD eng. **Novac Ovidiu-Constantin**			
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	FD

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 seminar/laboratory/project	14/-/-
Distribution of time					33 hours
Study using the manual, course support, bibliography and handwritten notes					13
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					13
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	(Conditions) - Computer skills, linear algebra
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. The course takes place with the modern techniques available: laptop, video projector, whiteboard or on specialized platforms for online courses (Moodle: e.uoradea.ro, Microsoft Teams).
5.2.for the development of the academic seminary/laboratory/project	- Students presence to all seminary hours is compulsory - The seminar can be held face-to-face or online. - course notes, recommended bibliography

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	

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 "Theory of probability and mathematical statistics" aims to familiarize students with the features of the basic principles of probability and mathematical statistics. Learning and understanding methods, procedures, probabilistic and statistical methodologies used in information technology issues.
7.2 Specific objectives	Using the terminology and basic concepts of Probability Theory, as well as those of Mathematical Statistics, the discipline aims to acquire skills in mathematical testing (statistics) of the values of the operating parameters of various electronic equipment in the field of information technology. After completing the discipline "Theory of probability and mathematical statistics", students acquire 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
I. ELEMENTS OF PROBABILITY THEORY 1.1. Probability field. (Field of events. Field of probability. Probability. Independent events. Dependent events. Conditional probabilities. Total probability formula. Bayes' formula.)	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
1.2. Probabilistic schemes. (Binomial scheme, multinomial scheme, Poisson, Scheme of the returned ball, Pascal's scheme)	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
1.3. Random variables (Distribution functions. Probability density. Numerical characteristics of distribution functions. Operations with random variables. Probability density convolution product)	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	4
1.4. Numerical characteristics of random variables (Mean, Dispersion, Initial and centered moments of the order of Chebyshev's inequality).	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
1.5. Random vectors. Distribution function. Probability density. Marginal distributions. Covariance. Correlation coefficient. Regression.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
1.6. Characteristic function. Definition. Properties	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
. 1.7. Classical probabilistic distributions. Binomial distribution, Poisson, hypergeometric, Pascal and normal, uniform, Gamma, Beta, exponential, HI square, Student, Fischer-Snedecor.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
II. ELEMENTS OF MATHEMATICAL STATISTICS 2.1. Elements of selection theory. Distribution of selection data. Media and selection dispersions.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	4

2.2. Elements of estimation theory. Types of estimates. Methods for determining estimates. Maximum likelihood method. Confidence interval method.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	4
2.3. Verification of statistical hypotheses. Media tests: Z, T test, dispersion tests Hi Square test, F.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	4

Bibliography
1.Blezu, D., *Statistică* - Ed. „Alma Mater“ Sibiu, 2003;
2.Blaga P., *Teoria probabilităţilor şi statistică matematică* - Ed. Presa Clujană 2002;
3.Blaga P., *Statistica matematica prin Matlab*, - Ed.Polirom 2004;
4.Jaba E. ,Grama A., *Analiză stratistică prin SPSS*, - Ed.Polirom 2004;
5. Mihoc Gh., Micu N., *Teoria probabilităţilor şi statistică matematică*, - Ed. Did. şi Ped., Bucureşti, 1980.
6. https://e.uoradea.ro/course/view.php?id=1896 Materials (courses and seminars)

8.2 Seminar	Teaching methods	No. of hours/ Observations
1. Probability field. Total probability formula. Bayes' formula. Probabilistic schemes.	Solving and explaining exercises and problems of different types	2
2. Distribution function. Properties. Distribution densities.	Solving and explaining exercises and problems of different types	1
3. Numerical characteristics of random variables.	Solving and explaining exercises and problems of different types	1
4. Two-dimensional random variables. Covariance and correlation. Regression.	Solving and explaining exercises and problems of different types	1
5. Characteristic function	Solving and explaining exercises and problems of different types	1
6. Probabilistic distributions	Solving and explaining exercises and problems of different types	1
7. Elements of selection theory	Solving and explaining exercises and problems of different types	1
8. Elements of estimation theory. Estimates. Methods for determining estimates.	Solving and explaining exercises and problems of different types	2
9. Z, T tests on the average	Solving and explaining exercises and problems of different types	2
10. Hi square tests, F on dispersion	Solving and explaining exercises and problems of different types	2

Bibliography
1. Blezu, D., *Statistică* - Ed. „Alma Mater“ Sibiu, 2003;
2. Blaga P., *Teoria probabilităţilor şi statistică matematică* - Ed. Presa Clujană 2002;
3. Blaga P., *Statistica matematica prin Matlab*, - Ed.Polirom 2004;
4. Jaba E. ,Grama A., *Analiză stratistică prin SPSS*, - Ed.Polirom 2004;
5. Mihoc Gh., Micu N., *Teoria probabilităţilor şi statistică matematică*, - Ed. Did. şi Ped., Bucureşti, 1980.
6. https://e.uoradea.ro/course/view.php?id=1896 Materiale online (cursuri şi seminarii)

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	- the correctness and completeness of the assimilated notions; - an overall understanding of the importance of the discipline studied and the connection with the other fundamental disciplines; - logical coherence; - the degree of assimilation of the specialized language; - criteria regarding the attitudinal aspects: conscientiousness, interest in individual study.	The evaluation can be done face to face or online. Written or online exam. Online assessment - (Online questionnaire)	60 %
10.5 Seminar	- ability to operate with abstract knowledge; - ability to apply in practice; - criteria regarding the attitudinal aspects: conscientiousness, interest in individual study.	Tests Grade awarded for the quality of participation in the activities within the seminars	20% 20%

10.8 Minimum performance standard:

- Defining notions, stating theoretical results
- Identifying and selecting methods to approach simple concrete problems
- Elaboration of algorithms for solving a problem with a low degree of difficulty
- Carrying out demonstrations for studied mathematical results, with medium degree of difficulty
- Mathematical modeling of a problem with a low degree of difficulty

Minimum requirements for grade 5:
Attendance to at least 80% of the total number of course and seminar hours
Solving the individual topics within the seminar (50%)
Solving 50% of the exam applications
Requirements for grade 10:
Attendance to at least 80% of the total number of course and seminar hours
Integral solving of the individual topics within the seminar
Active participation in all activities organized during the course and seminar

Completion date:
14.09.2020

Date of endorsement in the department:
25.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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
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 electronic circuits I**			
2.2 Holder of the subject				Associate Prof.PhD. Castrase Simona Cristina			
2.3 Holder of the academic laboratory				S.l.PhD.eng. Burca Adrian			
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD

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	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	10
Tutorials	8
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	Mathematics, Physics
4.2 related to skills	

5. Conditions (where applicable)

5.1.for the development of the course	Videoproiector -on site, Moodle platform- online
5.2.for the development of the academic laboratory	Moodle platform- online Laboratory equipped with computers and specific equipment

6. Specific skills acquired	
Professional skills	Using knowledge of mathematics, physics, measurement, technical graphics, mechanical engineering, chemical, electrical and electronic engineering in control systems engineering.
Transversal skills	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	Course: Learning the fundamental notions regarding: electrical signals, theorems, technologies, principles of operation of electronic devices, basic knowledge and learning of methods to approach and solve electronic circuits. Laboratory: Deepening the knowledge acquired in the course and forming practical skills through

	experimental verification of common devices and circuits.
7.2 Specific objectives	Understanding the operation of the main semiconductor devices; Acquiring practical skills in using the characteristics of semiconductor devices; Development of skills and abilities necessary for the use of electronic devices in simple electronic circuits Acquiring practical skills and abilities in working with the main laboratory devices and in the physical realization of electronic circuits; Familiarization of students with the methods of design and simulation of electronic circuits. Assimilation of theoretical knowledge on the design and simulation of electronic circuits, Analysis of medium-high complexity circuits using simulation programs.

8. Contents*

8.1 Course	Teaching methods	No. of hours
Introductory notions. Presentation of the purpose, content and requirements of the course. Electrical signals. Laws and theorems of electronic circuits. Essentials about electronic circuits	Direct teaching aided by visual methods of presentation on site, and on the Moodle platform - online	2
Passive circuit elements. Electrical resistance. The capacitor. Coil. Characteristics. Passive component circuits.		4
Notions of semiconductor physics. Semiconductor diodes. Rectifier diodes. The ideal diode equation. The actual characteristic of the diode. Diode circuits in direct current mode.		4
Dioda Zenner. Symbol; Characteristic; Operation. Behavior with temperature. Catalog data. Application. Parametric stabilizer with Zenner diode.		2
High signal variable diode. Diode in alternating current regime, small signal. Applications. Other types of diodes.		2
The bipolar transistor. Structure, operation. Characteristics, parameters of the bipolar transistor. TB in direct current mode. Theoretical static characteristics. Real static characteristics. Equivalent circuits for direct current TB. Polarization circuits. TB in a.c. small signal. Scheme equivalent to "h" parameters for TB. Applications - Transistor amplification stages		4
Junction field effect transistor (TECJ). Structure, Operation. Applications. TECMOS with initial channel. Structure; Symbol; Operation. Characteristics. TECMOS with induced channel. Other devices based on MOS structures. TECMOS in integrated circuit technology.		2
The thyristor. Applications.		2
Junction transistor Structure, Operation. Applications		2
Semiconductor optoelectronic devices. Photometric quantities Photosensitive devices. Photoemisive devices. Applications.		4
Bibliography Simona Castrase – Electronica- curs - ISBN 978-606-10-1257-2, Ed. Universităţii Oradea, 2013 Simona Castrase - Dispozitive si circuite electronice, vol.1,Ed. Universităţii Oradea, 2004 S. Castrase, Componente şi circuite pasive, Curs, ISBN 978-606-10-1451-4, Ed. Universitatii Oradea, 2014. S. Castrase,Optoelectronică, Curs, ISBN 978-606-10-2079-9, Ed. Universitatii Oradea, 2019. C. Gordan –Electronică Analogică şi Digitală, Ed. Universităţii Oradea, 2011 Oltean, G., Dispozitive si circuite electronice. Dispozitive electronice, Ed. Risoprint, Cluj-Napoca,2004.		
8.2 Academic laboratory	Teaching methods	No. hours
1. Presentation of the laboratory, presentation the simulation program	laboratory applications, simulation program on site and on the Moodle platform - online	2
2. Study of current-voltage characteristics of diodes		2
3. Diode rectifiers. Filtration of rectified voltage.		2
4. Bipolar transistors. Study of the static input, transfer and output characteristics		2
5. Unijunction transistor Static characteristics		2
6. Optoelectronic devices		2
7. Recovery. Verification.		2
Bibliography S. Castrase, A. Burcă, C. Gordan-"Circuite electronice fundamenale, Îndr. Lab. ISBN978-606-10-1934-2 , Ed. Univ. Oradea, 2017 S. Castrase, A. Burcă, C. Gordan-"Dispozitive şi circuite electronice", Îndr. lab., ISBN 978-606-10-1610-5, Ed. Univ. Oradea, 2015 S. Castrase,S. Popa - Dispozitive si circuite electronice, Îndr. Lab., vol.2, Ed. Univ. Oradea, 2004 S. Castrase,S. Popa - Dispozitive si circuite electronice, Îndr. Lab., vol.1, Ed. 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 specialization curriculum of and from other university centers that have accredited this specialization.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum requirements for passing the exam (note 5): knowledge of the notions of electrical signals, laws and theorems on electronic circuits; knowledge of the representation and operation of electronic devices, knowledge of general concepts for rectifiers, amplifiers, For grade 10 thorough knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. thorough knowledge of the construction and operation of electronic devices; ability to explain the operation of voltage rectifiers; thorough knowledge regarding the realization, operation, calculation of amplification stages; The laboratory activity is completed and marked with a grade of 10	Written exam / online test	80%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5): knowledge on how to represent electronic devices, knowledge on the operation of electronic devices, minimum knowledge on the use of electronic simulation program Knowledge for grade 10: knowledge of the construction and operation of electronic devices, knowledge of signal representation on a circuit, ability to determine the performance of an electronic circuit, knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. 10% of the grade from the laboratory is the evaluation of individual topics.	Evaluation of works + test	20%
10.7 Project			
10.8 Minimum performance standard: The solution on time, 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.			

Completion date:

Date of endorsement in the department:

Date of endorsement in the Faculty Board:

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 Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor
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 programming and programming languages I**			
2.2 Holder of the subject				**Prof. dr. ing. Győrödi Cornelia Aurora**			
2.3 Holder of the academic seminar/laboratory/project				Sef. lucr. ing. Costea Claudiu			
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	Vp	2.7 Subject regime	FD

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	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	12
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	10
Tutorials	6
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)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that have installed DevC ++, Visual Studio 2019 and those are connected to the internet. The laboratory can take place face to face or online

6. Specific skills acquired	
Professional skills	C2. Working with fundamental concepts of computer science, information technology and communications Fundamental concepts regarding structured programming in the C language.
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	▪ Learning the basics of structured programming in the C language and training the skills needed to design high-performance and portable software.
7.2 Specific objectives	▪ Acquiring knowledge in the C language for writing programs that use a variety of data types specific to programming problems, use language modularization facilities, use different program control structures, use vectors and pointers to solve problems effectively, including structured data types in the solution of the problem. You will create their own data types and use functions from the C language libraries, as well as functions working with files.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER.1. Introduction - Structured programming - Representation by logical schemes of algorithms	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
CHAPTER.2. Introduction to programming in the C language		2 hours
CHAPTER.3. Structured programming in the C language		2 hours
CHAPTER.4. Control structures in the C language		2 hours
CHAPTER.5. Variables, operators and expressions in the C language		2 hours
CHAPTER.6. Functions		2 hours
CHAPTER 7. Arrays		2 hours
CHAPTER 8. Pointers		2 hours
CHAPTER 9. Characters and Strings		2 hours
CHAPTER 10. Structures, Unions, Bit Manipulations, and Enumerations		2 hours
CHAPTER 11. Recursion. Dynamic structures		2 hours
CHAPTER 12. Input/Output (I/O) functions for files		4 hours

Bibliography

1. **Győrödi Cornelia,** Győrödi Robert**,** Pecherle George, "*Programarea în limbajul C. Teorie și Aplicații*", Editura Universității din Oradea, 2015, ISBN 978-606-10-1522-1, nr. pag 250.
2. C: How to Program 8th Edition – H.M. Deitel, P.J. Deitel – 2016, Pearson – ISBN 978-0133976892
3. Programming: Principles and Practice Using C++ (2nd Edition), Bjarne Stroustrup, May 25, 2014, Addison-Wesley, ISBN - 978-0321992789.

<table>
<tr><td colspan="3">4. The Joy of C 3rd Edition – L.H. Miller, A.E. Quilici – 1997 Wiley – ISBN 047112933x
5. Data Structures, Algorithms & Software Principles in C – Thomas A. Standish – 1995 Addison-Wesley – ISBN 0201591189
6. D. Costea - “Inițiere în limbajul C” - Editura Teora - 1995
7. Győrödi Cornelia Aurora - “Programare în limbajul C”, 2015
8. https://e.uoradea.ro/course/view.php?id=6127 Materials (courses and laboratories)</td></tr>
<tr><td>8.2 Academic laboratory</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Presentation of the DevC ++ programming environment. Writing algorithms using logic schemes.</td><td rowspan="13">Oral presentation

The students work with the Dev-C ++ programming environment (or alternatives such as Code Blocks, Visual C ++, etc.)
The materials (courses and laboratories) are posted on an elearning platform, available at http://e.uoradea.ro, where students have access by username and password. Also, by the online platform, they send the solved assignments from each laboratory.

The students are assessed by a practical test using computer from laboratory topics.</td><td>2 hours</td></tr>
<tr><td>2. Introduction to programming in the C language. Writing a program in the C language. Debug of programs. Important errors. Header files, project files.</td><td>2 hours</td></tr>
<tr><td>3. The Selection statements.</td><td>2 hours</td></tr>
<tr><td>4. Control structures in the C language. The Repetitive statements: for, while, do / while. The Break and continue statements.</td><td>2 hours</td></tr>
<tr><td>5. Variables, operators and expressions in the C language</td><td>2 hours</td></tr>
<tr><td>6. Functions</td><td>2 hours</td></tr>
<tr><td>7. Arrays</td><td>2 hours</td></tr>
<tr><td>8. Pointers</td><td>2 hours</td></tr>
<tr><td>9. Characters and Strings</td><td>2 hours</td></tr>
<tr><td>10. Structures, Unions, Bit Manipulations, and Enumerations</td><td>2 hours</td></tr>
<tr><td>11. Recursion. Dynamic structures</td><td>2 hours</td></tr>
<tr><td>12. Input/Output (I/O) functions for files</td><td>4 hours</td></tr>
<tr><td>13. Final test</td><td>2 hours</td></tr>
<tr><td colspan="3">Bibliography
1. Győrödi Cornelia Aurora - “Programare în limbajul C” – Indrumător de laborator în format electronic, 2013
2. C: How to Program 8th Edition – H.M. Deitel, P.J. Deitel – 2016, Pearson – ISBN 978-0133976892
3. Programming: Principles and Practice Using C++ (2nd Edition), Bjarne Stroustrup, May 25, 2014, Addison-Wesley, ISBN - 978-0321992789.
4. Győrödi Cornelia, Győrödi Robert, Pecherle George, “Programarea în limbajul C. Teorie și Aplicații”, Editura Universității din Oradea, 2015, ISBN 978-606-10-1522-1, nr. pag 250.
5. https://e.uoradea.ro/course/view.php?id=6127 Materials (courses and laboratories)</td></tr>
</table>

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

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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: 50% of the subjects from the final exam should be correctly solved For 10: 100% of the subjects from the final exam should be correctly solved	Continuous Assessment – written Two Assessments during the semester from the subject of course and laboratory.	66%

10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	34%
10.7 Project			
10.8 Minimum performance standard: Course: 50% of the maximum score of the cumulate Assessments Academic seminar: Laboratory: 50% of the maximum score of the laboratory test Project:			

Course instructor

Head of department

Completion date:
20.05.2021

prof. dr. ing. Cornelia Győrödi
E-mail: cgyorodi@uoradea.ro

prof. dr. ing. Silaghi Helga

Date of endorsement in the department:

Date of endorsement in the Faculty Board:

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 System Engineering and Management
1.4 Field of study	Control System Engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Aplied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				Electrotechnics I			
2.2 Holder of the subject				**ARION MIRCEA NICOLAE**			
2.3 Holder of the academic seminar/laboratory/project				**ARION MIRCEA NICOLAE** **SLOVAC FRANCISC**			
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Ex-Exam Continuous Assessment	2.7 Subject regime	Domain Discipline

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	1/1/-
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/14/ -
Distribution of time					69 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					14
Tutorials					14
Examinations					7
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	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted online or face to face in the amphitheater with modern techniques available: Video projector, Blackboard, Free speech

5.2.for the development of the academic seminary/laboratory/project	The seminar / laboratory can be held face to face or online The seminar discusses theoretical aspects of the course and their applications with personal contributions of students. The practical applications are made using the modern working means existing in the Electrical Engineering laboratory (DEGEM workstations, high-performance and current measuring devices, modeling software, etc.). Students come with the observed laboratory work Mandatory presence at all laboratories It is possible to recover during the semester 30% of the laboratory works;

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. C1.1 Use in professional communication of the concepts, theories and methods of fundamental sciences used in systems engineering. C1.2 Explain the problems to be solved and argue the solutions in systems engineering, by using techniques, concepts and principles from mathematics, physics, technical graphics, electrical engineering, electronics. C1.3 Solve the usual problems in the field of systems engineering by identifying appropriate techniques, principles, methods and by applying mathematics, with emphasis on numerical calculation methods.
Transversal skills	CT2. Identifying 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 "Electrotechnics I" ensures the basic theoretical and practical technical training of students, presents elements of the theory of electrical circuits in terms of applications in technology addressing students in the first year of study. Being a fundamental domain discipline, its objective is the presentation in a unitary framework of some calculation methods of general interest, necessary to solve the different problems specific to the classical or modern electrical engineering. ▪ The discipline tries to form the following attitudinal competencies: manifestation of a positive and responsible attitude towards the scientific field / optimal and creative capitalization of one's own potential in scientific activities / involvement in promoting scientific innovations / engaging in partnerships with others / participation in own development professional
7.2 Specific objectives	▪ The course "Electrotechnics I" presents elements of the theory of electrical circuits: the regime approaches for the electrical circuits (linear electrical circuits in stationary regime, nonlinear direct current, in permanent sinusoidal regime) as well as the specific methods of analysis of electrical circuits presented. ▪ The course begins with the presentation of the constituent elements of electrical circuits and the problems related to the automatic formulation of the equations of electrical circuits. The characterization of the periodic sinusoidal regime and the presentation of the complex analysis method are presented. ▪ The objectives of the discipline are to know and understand the basic relationships of electrical circuits in nonlinear steady state direct current, in permanent sinusoidal mode, explaining and interpreting the behavior of electrical circuits, performing calculations and determinations in electrical circuits, experimental verification of basic relationships for physical systems encountered in industrial practice, simulating the operation of electrical circuits with specialized software. ▪ The activity at the seminar is focused on applications specific to the chapters taught in the course and aims to form calculation skills. Applications in the field of electrical circuits are, in most cases, situations that shape real circuits in technology.

	▪ The laboratory activity is focused on applications specific to the chapters taught in the course and aims at the experimental verification of the basic relations for the encountered physical systems. The performance of laboratory works offers, in addition to the formation of skills in the electrical field, the use of physical and numerical modeling, sizing of assemblies, the correct use of measuring equipment, evaluation of errors in experimental determinations performed.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 1. STATIONARY LINEAR ELECTRICAL CIRCUITS Generalities. References. DC circuit elements. Diagrams and graphs of electrical circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Voltage-current characteristics of linear circuit elements Kirchhoff's theorems. Independent equations Transfiguration theorems. Transfiguration of series connected network sides	Video projector, slides and whiteboard. Interactive teaching	2
Transfiguration of network sides connected in parallel. Transfiguration of a voltage generator into a current generator.	Video projector, slides and whiteboard. Interactive teaching	2
Methods for calculating linear electrical circuits. Kirchhoff's theorem method. Algorithm Cyclic or contour current theorem. Algorithm	Video projector, slides and whiteboard. Interactive teaching	2
Node potential theorem. Algorithm Superposition theorem. Algorithm	Video projector, slides and whiteboard. Interactive teaching	2
Power conservation theorem. Regime specific applications	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 2. NON-LINE DC ELECTRICAL CIRCUITS Nonlinear element. Characteristics Kirchhoff's theorems and small variations. Methods for solving nonlinear networks. Graphic methods.	Video projector, slides and whiteboard. Interactive teaching	2
Non-linear circuits connected in series. Nonlinear circuits connected in parallel. The characteristic of an active network side. Nonlinear element connected in series with a linear element	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 3. PERMANENTLY SINUSOIDAL ELECTRICAL CIRCUITS Generalities. Circuit elements. Resistor, Coil, Coupled Coils, Capacitor Voltage sources, current sources	Video projector, slides and whiteboard. Interactive teaching	2
Kirchhoff's theorems and Joubert's theorem in instantaneous values. Alternative sinusoidal sizes Representation of alternative sinusoidal quantities	Video projector, slides and whiteboard. Interactive teaching	2
Analytical representation (in complex) of alternative sinusoidal quantities RLC series circuit. Facial diagrams RLC parallel circuit. Facial diagrams	Video projector, slides and whiteboard. Interactive teaching	2
Complex impedance and admittance Joubert's theorem and Kirchhoff's theorems in complex form	Video projector, slides and whiteboard. Interactive teaching	2

The analogy between direct current and sinusoidal alternating current Specific applications of the a.c. using Kirchhoff's theorems for stinging without magnetic couplings	Video projector, slides and whiteboard. Interactive teaching	2
Electric power in single-phase alternating current circuits Specific applications of the a.c. using Kirchhoff's theorems for circuits without magnetic couplings	Video projector, slides and whiteboard. Interactive teaching	2

Bibliography

1. Leuca T., Carmen Otilia Molnar, Arion M. N. – Elemente de bazele electrotehnicii. Aplicaţii utilizând tehnici informatice. Editura Universităţii din Oradea, 2014
2. Balabanian, N., Bickart, T. - Teoria modernă a circuitelor, Ed.Tehnică, Bucureşti, 1975.
3. Dumitriu,L.,Iordache,M.-Teoria circuitelor electrice 1,2, Editura ALL EDUCATIONAL S.A.,Bucuresti,1998,2000.
4. Leuca,T.,s.a.-Elemente de Bazele electrotehnicii,Aplicatii utilizand tehnici informatice,Editura Universitatii din Oradea,2014.
5. Leuca, T. – Elemente de teoria câmpului electromagnetic. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002.
6. Leuca, T., Molnar Carmen - Circuite electrice. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002.
7. Mocanu, C. I. - Teoria circuitelor electrice, Ed. Didactică şi Pedagogică, Bucureşti, 1979.
8. Preda, M., Cristea, P. - Analiza şi sinteza circuitelor electrice, Ed. Tehnică Bucureşti, 1968.
9. Răduleţ, R. - Bazele teoretice ale electrotehnicii, vol. I,II,III,IV, Ed. Energ. de Stat, Bucureşti, 1954-1956.
10. Simion, E., Maghiar, T. - Electrotehnică, Ed. Didactică şi Pedagogică, Bucureşti, 1981.
11. Şora, C.- Bazele electrotehnicii, Ed. Didactică şi Pedagogică, Bucureşti, 1982.

8.2 Seminary	Teaching methods	No. of hours/ Observations
Stationary linear electrical circuits. Kirchhoff's theorem method	Interactive whiteboard teaching applications with personal and student contributions.	2
Stationary linear electrical circuits. Cyclic current method	Interactive whiteboard teaching applications with personal and student contributions.	2
Stationary linear electrical circuits. Node potential method	Interactive whiteboard teaching applications with personal and student contributions.	2
Nonlinear electrical circuits in steady state	Interactive whiteboard teaching applications with personal and student contributions.	2
Linear electrical circuits in permanent sinusoidal mode without magnetic couplings	Interactive whiteboard teaching applications with personal and student contributions.	2
Permanent sinusoidal linear electrical circuits without magnetic couplings	Interactive whiteboard teaching applications with personal and student contributions.	2
Knowledge test	Test	2
8.2 Laboratory	Teaching methods	No. of hours/ Observations
Lab presentation. Theoretical notions of health and safety protection during practical activities from the laboratory	Aspects regarding the norms of health and safety protection during work in the electrical engineering laboratory are presented and discussed. The circuit elements, the measuring devices are presented	2

Circuit elements, apparatus for measuring voltages and currents. Measurement of currents, voltages and resistances. Electric potentiometer	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Ohm's law. Experimental verification.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Series resistors. Parallel resistors. Power developed in a resistor	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Experimental verification of Kirchhoff's first theorem. Experimental verification of Kirchhoff's second theorem	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
The use of Oscilloscope for the sin-wave studdyng	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Verification of knowledge,	Verification test	2

Bibliography

1. 1. Leuca, T. - Bazele electrotehnicii - îndrumător de laborator, litografiat Univ. din Oradea, 1991
2. Maghiar, T., Leuca, T., Silaghi, M., Marcu, D. - Circuite de curent continuu în regim permanent sinusoidal - îndrumător de laborator, litografiat Universitatea din Oradea, 1997.
3. Molnar Carmen, Arion M. – Electrotehnică. Aplicaţii practice – Editura Universităţii din Oradea, 2003
4. Leuca, T., Maghiar, T. - Electrotehnică, Probleme, vol. IV, Litografia Univ. din Oradea, 1994.
5. Leuca, T., M. Silaghi, Laura Coroiu, Carmen Molnar. - Electrotehnică, Probleme, vol.V, Litografia Univ. din Oradea, 1996.
6. Răduleţ, R. - Bazele electrotehnicii, Probleme, vol. I,II,III, E.D.P., Bucureşti, 1958, 1981

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	-	Written examination	60 %
10.6 Seminary	-	Knowledge assessment test	20 %
10.6 Laboratory	-	Knowledge assessment test	20 %

10.8 Minimum performance standard:

- Understanding how to solve electrical circuit problems encountered in practical applications.
- Direct determination of electrical quantities using measuring devices.
- Solving the problems of linear electrical circuits in stationary regime, the problems of electrical circuits in permanent sinusoidal regime and the problems of electrical circuits using professional programs of numerical analysis.
- The timely 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.

Completion date:
07.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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: -			

Completion date:
10.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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: -			

Completion date:
10.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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			

Completion date:
07.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**Applied informatics**					
2.2 Holder of the subject		**Lect. PhD eng. Viorica Spoială**					
2.3 Holder of the academic laboratory/project		**Lect. PhD eng. Viorica Spoială**					
2.4 Year of study	**I**	2.5 Semester	**1**	2.6 Type of the evaluation	**VP**	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 laboratory	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	25
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	18
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
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	Minimum knowledge of computer using
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	**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	• The discipline has as objective the familiarization of the students with computing systems, the operating system Windows 10 and the MS Office sofware suite, as well as the algorithms principles.
7.2 Specific objectives	• Number conversions in different numbering basis • Description of computing systems structure and operating mode. • Windows 10 operating system characteristics • Applications in *Command Prompt*, *Total Commander*, *File Explorer*, *Microsoft Word*, *Excel*, *PowerPoint* and *Access*

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1.Arithmetic basis of computing systems - information representation in computers - conversions in different numbering basis	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
2.Algorithms - definitions - algoritms' representation - algorithms' testing and debugging	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
3.Computing systems - hardware structure - functions - classification	Free exposure, with the presentation of the course with video projector, on the board or online	6 h

4.Software components of the computing systems - system programs, - application programs - utility programs	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
5.Windows 10 operating system	Free exposure, with the presentation of the course with video projector, on the board or online	6 h
6.MS Office Suite, Adobe Acrobat Pro - MS Word - MS Excel - MS PowerPoint - MS Access	Free exposure, with the presentation of the course with video projector, on the board or online	6 h
Total		28 h

Bibliography

1. Spoială Viorica, **Informatică aplicată**, curs în format electronic, 2020
2. Spoială Dragoş-Cristian, Spoială Viorica, **Utilizarea calculatoarelor**, Editura Universităţii din Oradea, 2010
2. Mirela Pater, **Utilizarea şi programarea calculatoarelor**, Editura Universităţii din Oradea, 2004
3. Ioan Străinescu, **Curs de informatică şi tehnologia informaţiei,** http://ebooks.unibuc.ro/informatica/info/CUPRINS.htm
4. http://jalobean.itim-cj.ro/Cursuri/ArhCalc/Materiale/carte/cap3.htm

5.Thomas H. Cormen, **Introducere în algoritmi**, Editura Byblos, 2004

6. www.tutorialspoint.com, **Windows 10**

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms. Numbering basis. Conversions and operations with numbers written in different numbering basis.	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	4 h
2. Command Prompt application in Windows systems		2 h
3. Total Commander and File Explorer		2 h
4. Introduction in Microsoft Word. Tables and equations		2 h
5. Microsoft Word. Edit the documents, drawings and graphs		2 h
6. Microsoft Word. Table of contents, Bibliography, Captions, Hyperlinks, Mail Merge, Reviews		2 h
7. Introduction in Microsoft Excel. Functions		2 h
8.Microsoft Excel. Graphical representation of data and surfaces		2 h
9. Microsoft Excel. Macros		2 h
10. Microsoft Excel. Pivot-tables		2 h
11. Microsoft PowerPoint presentations		2 h
12. Microsoft Access databases		2 h
13. Recoveries and closing the situation at the laboratory.		2 h
Total		**28 h**

Bibliography

1. 1.Viorica Spoială, Dragoş Cristian Spoială, **Informatică aplicată**, îndrumător de laborator, ediție CD-ROM, ISBN 978-606-10-2115-4, 2020

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, Gh. Asachi University of Iasi, etc.). The concepts and the applications presented in the courses and laboratories are 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 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**: usage of the concepts and instruments from the computer science and information technology field, in order to solve specific problems for system engineering; knowledge of the architecture of computing systems; knowledge of the software components of computing systems; participation at least of half of courses. **Laboratory:** the ability of operating with different representations of informations in computing systems; the ability of using the operating system Windows 10; the ability of performing and working with professional aspects documents, tabular computing sheets, professional presentations and databases; 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.			

Completion date:
16.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	1h

	online	
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 Universității "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 subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
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			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	1h

	online	
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 Universității "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 subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
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			

Completion date:
01.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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 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.	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
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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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					48 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					12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					
Examinations					4
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	(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:
4.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**Signal processing**					
2.2 Holder of the subject		Lect. Eng. Reiz Romulus, PhD					
2.3 Holder of the academic seminar/laboratory/project		Lect. Eng. Reiz Romulus, PhD					
2.4 Year of study	II	2.5 Semester	IV	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	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	36 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	8
Tutorials	2
Examinations	6
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. Conditions (where applicable)

5.1. for the development of the course	Video projector The course can take place on site or online
5.2.for the development of the academic seminary/laboratory/project	Computer network, Matlab with toolbox signals processing, Signal generators, Spectrum analyzers, Oscilloscopes Laboratory work can be carried out on site 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.** - Explaining the problems to be solved and arguing the solutions in systems engineering, by using techniques, concepts and principles from mathematics, physics, technical graphics, electrical engineering, electronics. - Solving the usual problems in the field of systems engineering by identifying appropriate techniques, principles, methods and by applying mathematics, with emphasis on numerical calculation methods.
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	▪ This discipline aims to familiarize students, from this specialization, with the notions, transforms and basic methods used in the analysis and processing of analog and digital signals. At the same time, an introduction to the theory of filtering (analog, with switched capacities, digital) is made and several methods for designing these categories of circuits are proposed
7.2 Specific objectives	▪ Knowledge of basic concepts in the field of continuous and discrete signals analysis, both periodic and aperiodic. ▪ Ability to choose the appropriate method for time and spectral analysis of a stationary signal. ▪ Ability to design simple structures of passive filters (constant k, bridge, m derivatives compounds), active (single or multiple reaction, with controlled voltage source) ▪ Ability to analyze the transfer functions of active filters.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Periodic signals defined in continuous time - Fourier series (trigonometric, harmonic, complex); Defining amplitude and phase spectra; Spectral energy distribution.	Lecture, presentation, debate	2 hours
2. Aperiodic signals defined in continuous time I. - Fourier transform (definitions, conditions of existence, definition of amplitude and phase spectra); Laplace transform (definitions, conditions of existence).	Lecture, presentation, debate	2 hours
3. Aperiodic signals defined in continuous time II. - Modulated signals with harmonic carrier (in amplitude, frequency, phase); Defining the modulation coefficients, the spectral content, the useful band, the effective value.	Lecture, presentation, debate	2 hours
4. Signals defined in discrete time I - Defining the sampled signals; Sampling theorem; Transform z (definition of direct and inverse forms; domain of existence).	Lecture, presentation, debate	2 hours
5. Signals defined in discrete time II - Modulated signals with pulse carrier (in amplitude, in position, in frequency, in duration).	Lecture, presentation, debate	2 hours
6. Passive electrical filters I - Constant type K filters (low-pass, high-pass, band-pass, stop-band type structures).	Lecture, presentation, debate	2 hours
7. Passive electrical filters II - Derived type m filters (generalities, series and parallel m derivations, low-pass, high-pass, pass-band, stop-band type structures).	Lecture, presentation, debate	2 hours
8. Passive electric filters III - Bridge filters (general, low-pass, high-pass, band-pass, stop-band type structures).	Lecture, presentation, debate	2 hours
9. Active electric filters I - Simple feedback active filters (general, low-	Lecture,	2 hours

pass, high-pass, band-pass, stop-band type structures).	presentation, debate	
10. Active electric filters II - Active filters with multiple feedback (generalities, low-pass, high-pass, band-pass, stop-band structures).	Lecture, presentation, debate	2 hours
11. Active electric filters III - Active filters with controlled voltage source (general, low-pass, high-pass, pass-band, stop-band type structures).	Lecture, presentation, debate	2 hours
12. Filters with switched capacities - The principle of using switched capacities; Methods of designing filters with switched capacities.	Lecture, presentation, debate	2 hours
13. Numerical filters I - General; Recursive and non-recursive filter structures.	Lecture, presentation, debate	2 hours
14. Numerical filters II - Design methods of digital filters (based on the bilinear z transformation, on the approximation of the differential equation of the analog filter, filters with linear phase characteristic).	Lecture, presentation, debate	2 hours
Bibliography 1. Semnale, circuite şi sisteme, C. Gordan, Editura Univ.Oradea 2000. 2. Analiza şi sinteza semnalelor, Cornelia Gordan, Romulus Reiz, Editura Univ. Oradea 2008 3. Circuite cu capacităţi comutate, Ad.Mateescu, Al.Şerbănescu, Editura Militară, Bucureşti 1995. 4. Semnale şi sisteme – Aplicaţii în filtrarea semnalelor, Ad.Mateescu, ş.a., Editura Teora Bucureşti, 2001. 5. Filtre, C.Gordan, R.Reiz, Editura Univ.Oradea 2006, ISBN 973-759-176-0		

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Study of periodic signals	Practical application	2 hours
2. Determination of Fourier series for any periodic signals	Practical application	2 hours
3. Direct and reverse Fourier transforms of continuous signals	Practical application	2 hours
4. Sampling signals	Practical application	2 hours
5. Second order active filter with controlled voltage source	Practical application	2 hours
6. Design of Butterworth type filters	Practical application	2 hours
7. Recovery of missed laboratories	Practical application	2 hours
Bibliography 1. Laboratory guide - electronic format CD		

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 in accordance with the subject taught in other university centers. For a better adaptation to the requirements of the labor market of the content of the discipline, meetings were held with representative employers in the field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Verification of theoretical knowledge. Correct and complete treatment of exam subjects related to signal analysis and synthesis and detailed knowledge of operating principles, relationships and fundamental schemes for passive and active filters and their applications; Minimum required conditions for passing	Written assessment (during the semester). The evaluation can be done face to face or online	70%

	the examination (grade 5): Minimum knowledge of analysis and synthesis of continuous and discrete signals, periodic and aperiodic, of design of simple passive and active filter structures		
10.5 Academic seminar	-	-	-
10.6 Laboratory	Carrying out all laboratory applications provided in the discipline file. Active participation in all laboratory classes with a very good presentation of the works by the student. Minimum required conditions for promotion (grade 5): Carrying out the laboratory applications provided in the subject sheet		30%
10.7 Project	-	-	-
10.8 Minimum performance standard: Knowledge of the fundamental elements of theory, solving simple problems. Knowledge of elementary signals, and the most used passive and active analog filter circuits.			

Completion date:
21.09.2020

Course holder
email: rreiz@uoradea.ro
tel.0259408191

Seminar/laboratory/project holder
email: rreiz@uoradea.ro
tel.0259408191

Date of endorsement in the department:
28.09.2020

Signature of the department director
Prof. Daniel TRIP, PhD
E-mail: dtrip@uoradea.ro

Signature of the department director
Prof. Helga SILAGHI, PhD
E-mail: hsilaghi@uoradea.ro

Date of endorsement in the Faculty Board:
28.09.2020

Signature of the Dean
Dean,
Prof.habil. Ioan Mircea GORDAN, PhD
E-mail: mgordan@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	**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-	6 h

	line	
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**			

Completion date: 07.09.2020

Date of endorsement in the department: 26.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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
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 electronic circuits II**			
2.2 Holder of the subject				Associate Prof.PhD.Castrase Simona Cristina			
2.3 Holder of the academic laboratory				S.l.PhD.eng. Burca Adrian			
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	VP	2.7 Subject regime	FD

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	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	10
Tutorials	8
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	Mathematics, Physics, Linear electronic circuits I
4.2 related to skills	

5. Conditions (where applicable)

5.1.for the development of the course	Videoproiector -on site, Moodle platform- online
5.2.for the development of the academic laboratory	Moodle platform- online Laboratory equipped with computers and specific equipment

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	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 aims to familiarize students with the terminology used in electronics and to give them an overview in the field. Course: Learning the basic notions regarding: concepts, technologies, principles of operation of the main electronic devices, basic knowledge and learning methods to approach and solve electronic circuits. Study of the principles and analysis of the functioning of some types of electronic circuits and their applications. Highlighting in each topic approached the essential problems necessary to understand the phenomena that allow the student to form a way of thinking and creatively developing the problems that will appear later in this field. Laboratory: Deepening the knowledge acquired in the course and forming practical skills through experimental verification of common devices and circuits.
7.2 Specific objectives	Acquiring practical skills and abilities in working with the main laboratory devices and in the physical realization of electronic circuits; Familiarization of students with the methods of design and simulation of electronic circuits. Assimilation of theoretical knowledge on the design and simulation of electronic circuits, Analysis of medium-high complexity circuits using simulation programs

8. Contents*

8.1 Course	Teaching methods	No. of hours
Analysis of the dynamic regime in passive circuits. DC RL / RC circuits, applications.	Direct teaching aided by visual methods of presentation on site, and on the Moodle platform - online	2
Alternating sinusoidal circuits. Methods for solving sinusoidal circuits. Ideal circuit elements in a.Circuits in a.c.		2
Single-phase single-alternating rectifiers. Single-phase two-alternating rectifiers. Three-phase rectifiers		4
Signal filters.		2
Stabilization schemes. Voltage stabilizers Current stabilization schemes		4
Fundamental amplification circuits General. Parameters. Amplifier performance classes. Amplification floor transfer characteristic.		2
Applications - Transistor amplification stages		4
Operational amplifiers. The ideal operational amplifier. The actual operational amplifier. Linear and nonlinear applications with AO.		4
Oscillators. Positive reaction. RC oscillators. LC oscillators. Practical schemes with oscillators		2
Pulse circuits; linear and nonlinear high force pulse circuits, relaxation oscillators, tilting circuits.		2
Bibliography Simona Castrase – Electronica- curs - ISBN 978-606-10-1257-2, Ed. Universităţii Oradea, 2013 Simona Castrase - Dispozitive si circuite electronice, vol.1,Ed. Universităţii Oradea, 2004 S. Castrase, Componente și circuite pasive, Curs, ISBN 978-606-10-1451-4, Ed. Universitatii Oradea, 2014. S. Castrase,Optoelectronică, Curs, ISBN 978-606-10-2079-9, Ed. Universitatii Oradea, 2019. C. Gordan –Electronică Analogică și Digitală, Ed. Universităţii Oradea, 2011 Oltean, G., Dispozitive si circuite electronice. Dispozitive electronice, Ed. Risoprint, Cluj-Napoca,2004.		
8.2 Academic laboratory	Teaching methods	No. of hours
1. Presentation of the laboratory, presentation the simulation program	laboratory applications, simulation program on site and on the Moodle platform - online	2
Rectifiers. Filtration of rectified voltage.		2
3. Voltage stabilizers.		2
4. Elementary amplifiers with bipolar transistor: common emitter, common base, common collector.		2
5. Electronic amplifiers. AO applications.		2
6. Study of oscillators		2
7. Recovery. Verification.		2
Bibliography S. Castrase, A. Burcă, C. Gordan-"Circuite electronice fundamenale, Îndr. Lab. ISBN978-606-10-1934-2 , Ed. Univ. Oradea, 2017 S. Castrase, A. Burcă, C. Gordan-"Dispozitive şi circuite electronice", Îndr. lab., ISBN 978-606-10-1610-5, Ed. Univ. Oradea, 2015 S. Castrase,S. Popa - Dispozitive si circuite electronice, Îndr. Lab., vol.2, Ed. Univ. Oradea, 2004 S. Castrase,S. Popa - Dispozitive si circuite electronice, Îndr. Lab., vol.1, Ed. 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 specialization curriculum of and from other university centers that have accredited this specialization.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum requirements for passing the exam (note 5): knowledge on the notions of electrical signals, laws and theorems on electronic circuits; knowledge of how to represent and operate electronic devices, knowledge of general concepts for rectifiers, amplifiers, For grade 10 thorough knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. thorough knowledge of the construction and operation of electronic devices; ability to explain the operation of voltage rectifiers; thorough knowledge regarding the realization, operation, calculation of amplification stages; The laboratory activity is completed and marked with a grade of 10	Written exam / online test	80%
10.5 Seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5):knowledge of how to represent electronic devices, knowledge of the operation of electronic devices, minimum knowledge of the use of the electronic simulation program Knowledge of grade 10: knowledge of the construction and operation of electronic devices, knowledge of signal representation on a circuit, ability to determine the performance of an electronic circuit, knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. 10% of the grade from the laboratory is the evaluation of individual topics.	Evaluation of works + test	20%
10.7 Project			
10.8 Minimum performance standard: The solution on time, 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.			

Completion date:

Date of endorsement in the department:

Date of endorsement in the Faculty Board:

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			**Object oriented programming**				
2.2 Holder of the subject			**Pater Alexandrina Mirela**				
2.3 Holder of the academic seminar/laboratory/project			**Sas Diana**				
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD - Specialized Discipline

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	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

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	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	21
Tutorials	3
Examinations	3
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	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed. The laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	CP2. Designing hardware, software and communication components
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 course aims to familiarize students with the object-oriented programming technique. The course introduces the basics of object-oriented programming with Java program examples. In the laboratory, students implement and verify on the computer both the programs discussed in the course and other proposed programs, deepening the theoretical and practical notions acquired. It was considered necessary to study a high-level programming language with widespread and topicality, namely the Java language.
7.2 Specific objectives	**Theoretical knowledge:** • Adequate use in professional communication of the concepts of computability, complexity, programming paradigms and modeling of computing and communications systems • Use of specific theories and tools (algorithms, schemes, models, etc.) to explain the operation and structure of software systems • To know the fundamental concepts of object-oriented programming, the concepts of classes and objects, constructors and destroyers, the techniques of overloading operators and functions, the technique of inheritance and derivation of classes, of polymorphism • To know the objective facilities offered by the Java programming language **Skills acquired:** • Master and use the Java programming language • To use in the creation of applications the objective facilities offered by the Java programming language • To solve various problems using the concepts of classes, objects • Solve various problems using the techniques of overloading operators and functions, inheritance and polymorphism • Evaluate and justify the effectiveness of methods chosen for implementation and adopt optimal solutions from different points of view

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Fundamental concepts in OOP - The premises of OOP. Fundamental concepts. Short characterization of the Java language.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 2. Basics of Java: Object and Driver Classes; Data types and operators; Strings of characters	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 3. Conditional statements; Statements of control	Powerpoint presentation with the help of the video	2 hours

	projector; free discussions;	
Chapter 4. Strings and exceptions	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 5. Classes, objects and methods	Powerpoint presentation with the help of the video projector; free discussions;	4 hours
Chapter 6. Parameters and overloading methods.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 7. Static modifier and nested classes	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 8. Inheritance.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 9. Polymorphism	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 10. Java interfaces	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 11. Abstract and generic classes	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 12. Collections	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 13. Sorts and searches	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

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[1] B. Eckel, *Thinking in Java,* 3/e, Prentice Hall, 2002
[2] H. M. Deitel, P. J. Deitel, *Java: How to Program*, 4/e, Prentice Hall, 2003
[3] J. Gosling, B. Joy, G. Steele, G. Bracha, *The JavaTM Language Specification*, 3/e, Addison-Wesley, 2005
[4] S. Tănasa, C. Olaru, S. Andrei, *Java de la 0 la expert*, Editura Polirom, 2003
[5] C. S. Horstmann and G. Cornell, *Core Java 2: Vol.1-Fundamentals*, 6/e, Prentice Hall, 2002
[6] C. S. Horstmann, *Computing concepts with Java 2 Essentials*, 3/e, John Wiley, 2003
[7] D. Logofătu, *Algoritmi fundamentali în Java. Aplicații*, Editura Polirom, 2007

https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/PCLP/Programarea%20calculatoarelor%20%C5%9Fi%20limbaje%20de%20programare%20%E2%80%93%20%C3%AEndrum%C4%83tor%20de%20laborator.pdf		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Labor protection training Introduction. Technologies used: Eclipse, IntelliJ	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Class and object applications, data types and operators, strings	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Statement applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
String applications and exceptions	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Class applications, objects and methods	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Applications Parameters and overloading methods	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Static modifier applications and nested classes	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Inheritance applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours

Applications of polymorphism	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Interface applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Abstract and generic class applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Collection applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Sorting and searching applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Final test		2 hours

Bibliograpy

[1] H. M. Deitel, P. J. Deitel, *Java: How to Program*, 4/e, Prentice Hall, 2003
[2] B. Eckel, *Thinking in Java,* 3/e, Prentice Hall, 2002
[3] J. Gosling, B. Joy, G. Steele, G. Bracha, *The JavaTM Language Specification*, 3/e, Addison-Wesley, 2005
[4] S. Tănasa, C. Olaru, S. Andrei, *Java de la 0 la expert*, Editura Polirom, 2003
[5] C. S. Horstmann and G. Cornell, *Core Java 2: Vol.1-Fundamentals*, 6/e, Prentice Hall, 2002
[6] C. S. Horstmann, *Computing concepts with Java 2 Essentials*, 3/e, John Wiley, 2003
[7] D. Logofătu, *Algoritmi fundamentali în Java. Aplicaţii*, Editura Polirom, 2007
https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/PCLP/Programarea%20calculatoarelor%20%C5%9Fi%20limbaje%20de%20programare%20%E2%80%93%20%C3%AEndrum%C4%83tor%20de%20laborator.pdf

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 specialization from 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 basic principles of object-oriented programming and implementation of software components, implementation of programs in areas of knowledge are stringent requirements of employers in the field (Qubiz, DecIT, Access, Trencadis, Diosoft, Five Tailors, 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 For 10: Knowledge Understanding	Written paper The evaluation can be done face to face or online	67%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10:Knowledge and understanding;Ability to explain and interpret;Complete and correct solution of the requirements.	- Laboratory / practical works -Tests during the semester The evaluation can be done face to face or online	33%
10.7 Project			
10.8 Minimum performance standard: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations. Development and implementation of algorithms using learned principles. The timely 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. Modeling a typical engineering problem using the formal apparatus characteristic of the field.			

Completion date: 20.09.2020

Date of endorsement in the department: 25.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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 System Engineering and Management
1.4 Field of study	Control System Engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Automatics and Aplied Informatics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				Electrotechnics II			
2.2 Holder of the subject				**ARION MIRCEA NICOLAE**			
2.3 Holder of the academic seminar/laboratory/project				**ARION MIRCEA NICOLAE** **SLOVAC FRANCISC**			
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Ex-Exam Continuous Assessment	2.7 Subject regime	Domain Discipline

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	1/1/-
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/14/ -
Distribution of time					69 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					14
Tutorials					14
Examinations					7
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	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted online or face to face in the amphitheater with modern techniques available: Video projector, Blackboard, Free speech

5.2.for the development of the academic seminary/laboratory/project	The seminar / laboratory can be held face to face or online The seminar discusses theoretical aspects of the course and their applications with personal contributions of students. The practical applications are made using the modern working means existing in the Electrical Engineering laboratory (DEGEM workstations, high-performance and current measuring devices, modeling software, etc.). Students come with the observed laboratory work Mandatory presence at all laboratories It is possible to recover during the semester 30% of the laboratory works;

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. C1.1 Use in professional communication of the concepts, theories and methods of fundamental sciences used in systems engineering. C1.2 Explain the problems to be solved and argue the solutions in systems engineering, by using techniques, concepts and principles from mathematics, physics, technical graphics, electrical engineering, electronics. C1.3 Solve the usual problems in the field of systems engineering by identifying appropriate techniques, principles, methods and by applying mathematics, with emphasis on numerical calculation methods. C5. Development of applications and implementation of algorithms and structures of automatic control, using project management principles, programming environments and technologies based on microcontrollers, signal processors, programmable automata, corporate systems
Transversal skills	CT2. Identifying 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 "Electrotechnics II" ensures the basic theoretical and practical technical training of students, presents electromagnetic phenomena in terms of applications in technology. It is a fundamental domain discipline that presents calculation methods of general interest, necessary to solve various problems specific to classical or modern electrical engineering. ▪ The discipline tries to form the following attitudinal competencies: manifestation of a positive and responsible attitude towards the scientific field / optimal and creative capitalization of one's own potential in scientific activities / involvement in promoting scientific innovations / engaging in partnerships with others / participation in own development professional

7.2 Specific objectives	▪ The course "Electrotechnics II" further presents elements of the theory of electrical circuits: the regime approach of electrical circuits (three-phase electrical circuits, linear electrical circuits in periodic non-sinusoidal mode, linear electrical circuits in transient mode) and specific methods of analysis of electrical circuits presented. The course continues with the presentation of the basic elements (quantities, units, general and material laws) of the macroscopic theory of electromagnetism, for understanding the technical applications of this theory. The study of the fundamental relations and electrostatic phenomena, of the electrokinetic regime and of the stationary regime of the magnetic field. Formulation of Maxwell's system of equations, which allows solving any field or circuit problem under certain specified conditions, and presenting applications of special importance in the electrical field. General laws of electrotechnics: Law of magnetic circuit, Law of electromagnetic induction, Maxwell's equations. ▪ The seminar applications aim to deepen the knowledge taught in the course: substantiation of the calculation methods of three-phase electrical circuits, linear electrical circuits in periodic non-sinusoidal regime, linear electrical circuits in transient regime, capacity calculation, electrostatic energy and electric field forces; to solve electromagnetic field problems. The activity at the seminar is focused on applications specific to the chapters taught in the course and aims to form calculation skills. Applications in the field of electrical circuits are, in most cases, situations that shape real circuits in technology. ▪ The laboratory activity is focused on applications specific to the chapters taught in the course and aims at the experimental verification of the basic relations for the encountered physical systems. The performance of laboratory works offers, in addition to the formation of skills in the electrical field, the use of physical and numerical modeling, sizing of assemblies, the correct use of measuring equipment, evaluation of errors in experimental determinations performed. Instruments: use of laboratory working methods, use of measurement techniques using the equipment provided, use of mathematical models for calculating errors, drawing graphs of variation and interpretation of the results obtained practically.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 3. PERMANENTLY SINUSOIDAL ELECTRICAL CIRCUITS Joubert's theorem in complex form for magnetically coupled circuits Kirchhoff's theorems, in complex, for magnetically coupled circuits	Video projector, slides and whiteboard. Interactive teaching	2
The power factor. Power factor compensation Constructive solutions regarding the power factor compensation	Video projector, slides and whiteboard. Interactive teaching	2
Complex representation of apparent power Maximum power transfer theorem Solving alternating current circuits in permanent sinusoidal regime Kirchhoff's theorem method. Algorithm. Features Cyclic current method. Algorithm. Features	Video projector, slides and whiteboard. Interactive teaching	2
Node potential method. Algorithm. Features Transfiguration theorems. Transfiguration of series connected circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Transfiguration of parallel connected circuits. Resonance phenomena in alternating current circuits Voltage resonance. Current resonance	Video projector, slides and whiteboard. Interactive teaching	2

CHAPTER 4. THREE-PHASE ELECTRICAL CIRCUITS Three-phase circuits and systems. Overview Production of a symmetrical three-phase system of electromotive voltages Three-phase circuit connections. Star connection of three-phase circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Triangle connection of three-phase circuits Three-phase star-connected receivers with neutral conductor Three-phase star-connected receivers without neutral conductor Three-phase circuits connected in a triangle Three-phase circuits powered by three-phase asymmetric voltage systems Electrical power in three-phase electrical circuits	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 5. LINEAR ELECTRICAL CIRCUITS IN PERIODIC NON-SINUSOIDAL REGIME Periodic non-sinusoidal regime. Generalities. Decomposition of periodic functions into Fourier series Actual and average values of periodic functions. Coefficients characteristic of periodic functions	Video projector, slides and whiteboard. Interactive teaching	2
Analysis of electrical circuits in permanent non-sinusoidal regime by decomposition into harmonics Non-sinusoidal terminal voltage resistor Voltage coil at non-sinusoidal terminals Live capacitor at non-sinusoidal terminals RLC circuits live at non-sinusoidal terminals Powers in non-sinusoidal regime	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 6. LINEAR ELECTRICAL CIRCUITS IN TRANSITORY REGIME Generalities. The direct method RL series circuits in transient mode. The direct method RC series circuits in transient mode. The direct method	Video projector, slides and whiteboard. Interactive teaching	2
Laplace transform method Laplace transforms. Laplace transform theorems Some details regarding the application of the Laplace transform in the study of electrical circuits	Video projector, slides and whiteboard. Interactive teaching	2
Operational form of electrical circuit equations. Operational impedances Networks in null initial conditions Networks in non-zero initial conditions	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 7. GENERAL ASPECTS ABOUT THE ELECTROMAGNETIC FIELD Terms and notions specific to the electromagnetic field in electrostatic regime, electrokinetics and stationary magnetic. General laws of electromagnetic phenomena Electrostatic potential theorem. Electric voltage Law of temporary electric polarization.	Video projector, slides and whiteboard. Interactive teaching	2
The law of electric flux The law of connection between D, E and p. Law of conservation of free electric charge The law of electrical conduction The law of transformation of electromag energy. by conducting electric currents	Video projector, slides and whiteboard. Interactive teaching	2

The law of magnetic flux The law of temporary magnetization The law of connection between B, H and M The law of the magnetic circuit The law of electromagnetic induction Specific applications of the studied regimes	Video projector, slides and whiteboard. Interactive teaching	2

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1. Leuca T., Carmen Otilia Molnar, Arion M. N. – Elemente de bazele electrotehnicii. Aplicaţii utilizând tehnici informatice. Editura Universităţii din Oradea, 2014
2. Balabanian, N., Bickart, T. - Teoria modernă a circuitelor, Ed.Tehnică, Bucureşti, 1975.
3. Dumitriu,L.,Iordache,M.-Teoria circuitelor electrice 1,2, Editura ALL EDUCATIONAL S.A.,Bucuresti,1998,2000.
4. Leuca,T.,s.a.-Elemente de Bazele electrotehnicii,Aplicatii utilizand tehnici informatice,Editura Universitatii din Oradea,2014.
5. Leuca, T. – Elemente de teoria câmpului electromagnetic. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002.
6. Leuca, T., Molnar Carmen - Circuite electrice. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002.
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8. Preda, M., Cristea, P. - Analiza şi sinteza circuitelor electrice, Ed. Tehnică Bucureşti, 1968.
9. Răduleţ, R. - Bazele teoretice ale electrotehnicii, vol. I,II,III,IV, Ed. Energ. de Stat, Bucureşti, 1954-1956.
10. Simion, E., Maghiar, T. - Electrotehnică, Ed. Didactică şi Pedagogică, Bucureşti, 1981.
11. Șora, C.- Bazele electrotehnicii, Ed. Didactică şi Pedagogică, Bucureşti, 1982.

8.2 Seminary	Teaching methods	No. of hours/ Observations
Sinusoidal linear electrical circuits with magnetic couplings	Interactive whiteboard teaching applications with personal and student contributions.	2
Non-sinusoidal linear electrical circuits.	Interactive whiteboard teaching applications with personal and student contributions.	2
Three-phase electrical circuits	Interactive whiteboard teaching applications with personal and student contributions.	2
Transient linear electrical circuits, direct method	Interactive whiteboard teaching applications with personal and student contributions.	2
Transient linear electrical circuits, Laplace transform method, in nule initial conditions	Interactive whiteboard teaching applications with personal and student contributions.	2
Transient linear electrical circuits, Laplace transform method, in non-nule initial conditions	Interactive whiteboard teaching applications with personal and student contributions.	2
Vector calculation. Vacuum electrostatic field and bodies Electrostatic field. Capacity calculation and capacitor network solving	Interactive whiteboard teaching applications with personal and student contributions.	2
8.2 Laboratory	Teaching methods	No. of hours/ Observations
Lab presentation. Theoretical notions of health and safety protection during practical activities from the laboratory	Aspects regarding the norms of health and safety protection during work in the electrical engineering laboratory are presented and discussed. The	2

	circuit elements, the measuring devices are presented	
Study of capacitive circuits in alternating current.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Study of inductive circuits in alternating current.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Study of RC circuits in alternating current. Study of RL circuits in alternating current	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Resonance of RLC circuits in alternating current	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Modeling of Laplacian fields by electrical networks	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Verification of knowledge,	Verification test	2

Bibliography

1. 1. Leuca, T. - Bazele electrotehnicii - îndrumător de laborator, litografiat Univ. din Oradea, 1991
2. Maghiar, T., Leuca, T., Silaghi, M., Marcu, D. - Circuite de curent continuu în regim permanent sinusoidal - îndrumător de laborator, litografiat Universitatea din Oradea, 1997.
3. Molnar Carmen, Arion M. – Electrotehnică. Aplicaţii practice – Editura Universităţii din Oradea, 2003
4. Leuca, T., Maghiar, T. - Electrotehnică, Probleme, vol. IV, Litografia Univ. din Oradea, 1994.
5. Leuca, T., M. Silaghi, Laura Coroiu, Carmen Molnar. - Electrotehnică, Probleme, vol.V, Litografia Univ. din Oradea, 1996.
6. Răduleţ, R. - Bazele electrotehnicii, Probleme, vol. I,II,III, E.D.P., Bucureşti, 1958, 1981

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	-	Written examination	60 %
10.6 Seminary	-	Knowledge assessment test	20 %
10.6 Laboratory	-	Knowledge assessment test	20 %

10.8 Minimum performance standard:

- Carrying out works and applications, in order to solve some problems specific to the electrical circuits, with the correct evaluation of the existing situation, of the available resources, in conditions of application and correct realization of the norms of safety and health at work. Principle of operation and composition of electrical circuits. Understanding electromagnetic phenomena

Completion date:
07.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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:			

Completion date: 10.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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	4
Chapter 2. Input, output, connection topologies. Bus communications. Protocols. Arbitrations. Methods of		4

communication with IO devices (Inputs-Outputs, Interrupts, DMA)	documentation and individual study	
Chapter 3. General information about computer networks, Network topologies and standards, HDLC protocol. ISO model of OSI architecture. ARPA Internet. Network topologies, standards and protocols		4
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,,

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	Oral presentation Following the presentation of the project completed during the semester, each	100%

	through all the design stages, with the completion of the elaboration of the project theme.	student receives a grade, separate from the exam.	

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

Completion date:
20.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

Completion date:
20.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	1h

	online	
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 Universității "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 subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
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			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	1h

	online	
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 Universității "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 subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
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			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	Solving specific applications. Discussions based on them.	2h
2. Mathematical modeling of electrical systems I		2h
3. Mathematical modeling of electrical systems II		2h
4. Mathematical modeling of mechanical systems		2h
5. Examples for mathematical modeling of discrete-events systems		2h
6. Simulation schemes for state-space models		2h
7. Mathematical modeling for system interconnections (time-domain)		2h
8. Mathematical modeling for system interconnections (block-scheme algebra)		2h
9. Sampling the MM for continuous-time systems. RIST models in state-space		2h
10. Sampling the MM for continuous-time systems. RIST models in state-space for systems with time-delay.		2h
11. Sampling the MM for continuous-time systems. RIST models in input-output space. Pulse transfer function.		2h
12. Sampling the MM for continuous-time systems. RIST models in input-output space. Pulse transfer function for systems with time-delay.		2h
13. Sampling the MM for continuous-time systems. Approximation methods		2h
14. Review of the seminar. Final test.		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 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 Evaluarea se poate face faţă în faţă sau on-line.	30%
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:

Completion date: 10.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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	Solving specific applications. Discussions and debates based on them.	2h
2. Time-response calculus for first order systems to step input		2h
3. Time-response calculus for first order systems to ramp input and Dirac pulse input		2h
4. Time-response calculus for first order systems to real step input		2h
5. Time-response calculus for first order systems to unit area pulse		2h
6. Time-response calculus for second order systems		2h
7. Frequency response for linear systems. Bode plots.		2h
8. Transfer plot (Nyquist II)		2h
9. Transfer plot (Nyquits) II		2h
10. Stability analysis through fundamental stability theorem		2h
11. Stability analysis through algebraic and frequency criteria		2h
12. Stability analysis through root locus method		2h
13. Controlability and observability analysis. Kalman criteria.		2h
14. Review of the seminar. Final test.		2h
8.3. Laboratory	Teaching methods	No. of hours/ Obs.
L1. Physical systems modeling	The students have to study the lab and complete the practical part guided by the teacher	2h
L2. Sampling methods for MM of continuous-time systems		2h
L3. Time-response calculus for linear systems		2h
L4. Frequency response calculus for linear systems		2h
L5. Stability analysis I. Stability criteria.		2h
L6. Stability analysis II. Stability methods.		2h
L7. Controlability and observability analysis		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	**Written and oral presentation** The students have to solve theoretical and applicative subjects.	60%

	standard, without presenting details For 10: throughout knowledge of all subject	The evaluation can be made face to face or online	
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:

Completion date: 10.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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 methods	No. of hours/ 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 1. 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, examples, individual work	2 hours
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	Written examination	60%

	regarding the execution of PLC programs - thorough knowledge regarding the PLC programming languages - thorough knowledge regarding the PLC 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

Completion date:
07.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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

Competenţe 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.
Competenţe 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	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
2. Tuning of PID controllers, Status adjustment		
3. Automatic adjustment systems used in servosystems - overview		2h/ weekly 3
4. DC servomotor model		
5. DC voltage source model		
6. Analog current control system for MCC using PI regulators		2h/ weekly 5
7. Automatic adjustment systems used in servo systems. The d. c. servomotor model		2h / weekly 7
8. Analog current control system for MCC using PI regulators		
9. Analog speed control system. Saturation of analog regulators		2h / weekly 9
10. Digital current control system for MCC using PI regulators		
11. Digital speed control system for MCC using PI controllers		2h / weekly 11
12. Saturation of digital PI regulators		
13. Recoveries		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 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	The examination is written and oral.	40% 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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	**Engineering and management**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Economic Engineering in Electric, Electronic and Energetic Field / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Automation**					
2.2 Holder of the subject		**Lect. PhD eng. Diana Sas**					
2.3 Holder of the academic laboratory/project		**Lect. PhD eng. Diana Sas**					
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**Ex**	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/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	hours
Study using the manual, course support, bibliography and handwritten notes	33
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	10
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	(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.**Make calculations, demonstrations and applications in order to solve specific automation and engineering tasks, based on knowledge achieved from fundamental sciences and engineering sciences. **C2**.Elaborate, interpret and analyze technical documents. **C5.**Technical and technological design of processes belonging to electric, electronic and energy engineering systems, structures and industry, according to quality requirements
Transversal skills	**TC1.**Responsibly apply the principles, norms and values of professional ethics in order to achieve the goals and identify the objectives, the available resources, the steps to be done and time spent for finishing the works, the deadlines, and the risks involved. **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 discipline has as objective the familiarization of the students with the field of automation. Theoretical and practical knowledge of automated systems is provided, as well as research, design and use of programmable logic controllers.
7.2 Specific objectives	• The course aims to present the theoretical elements of automated control systems, analogical modelling and numerical simulation of automated processes. • The laboratory familiarizes students with practical aspects of design, implementation and testing automated control loops including modern control methods with programmed logic and computer control.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction in automation 1.1. Graphical representation of automatic systems. 1.2. Schematic diagrams of automatic systems. 1.3. Components of automatic systems. 1.4. Functions of automatic systems. 1.5. Classification of automatic systems. 1.6. Problems with automatic systems.	Free exposure, with the presentation of the course with video projector, on the board or online	2h/week
2.Automation equipment 2.1. Elements of analog simulation of systems. 2.1.1. Active filter with operational amplifiers. 2.1.2. Performing mathematical operations using active filters with operational amplifiers 2.2. Low order dynamic systems. 2.2.1. Proportional transfer element. 2.2.2. Integrating transfer element. 2.2.3. Derivative transfer element of order 0. 2.2.4. Proportional filter with 1st order timing. 2.2.5. Derivative transfer element with 1st order timing. 2.3. Standard controllers		

2.3.1. Proportional derivative controller with 1st order timing. 2.3.2. Proportional integrator controller. 2.3.3. Derivative integrative proportional controller. Applications 2.4 Numerical controllers 2.5 Programmable controllers 2.6 Microcontrollers 2.7 Transducers and sensors		
3. Properties of automated systems 3.1 Stability of automated systems 3.2 Controllability of automatic systems 3.3 Performance indicators	Free exposure, with the presentation of the course with video projector, on the board or online	2h/week

Bibliography

1. T Coloşi, MI Abrudean, ML Unguresan, V Muresan, Numerical simulation of distributed parameter processes, Springer, 2013
2. D. Sas, *„Modelarea si simularea proceselor cu parametri distribuiti”*, Editura Galaxia Gutenberg, Cluj-Napoca, 2019, 98 pagini, ISBN: 978-973-141-804-9
3. T. Coloşi, M. L. Ungureşan, E. H. Dulf, R. C. Cordoş, “Introduction to Analogical Modeling and Numerical Simulation with (Mpdx) and Taylor Series Distributed Parameters Processes”, Editura Galaxia Gutenberg, Cluj-Napoca, Romania, 2009
4. Coloşi T., Abrudean M., Dulf E., Ungureşan M. L., „Numerical Modelling and Simulation Method with Taylor Series for Lumped and Distributed Parameters Processes“, Editura Mediamira, Cluj- Napoca, ISBN: (10) 973-713-108-8; (13) 978-973-713-108-9, 2006, p. 165
5. F.Golnaraghi ,C.B. Kuo *„Automatic Control Systems”*, Editura Wiley, 2009
6. J. Love , *„Proces Automation Handbook”*, Editura Springer, 2007
7. K.J. Åström, B. Wittenmark, *„Computer Controlled Systems: Theory and Design“*, Editura Prentice Hall, Englewood Cliffs, 1996.
8. www.mathworks.com
9. Coroiu Laura, Gergely Eugen Ioan, *Modelare şi simulare*, carte, Editura Universităţii din Oradea 2016, CD-ROM Edition, pg 94, 978-606-10-1861-1.
10. Coroiu Laura, *Modelare şi simulare*, Îndrumător de laborator, Editura Universităţii din Oradea 2014, CD-ROM Edition, pg 94, 978-606-10-1473-6.
11. I. Dumitrache, *Ingineria reglării automate*, Ed. Politehnica Press, 2005.
12. T.L. Dragomir, Şt. Preitl, *Regulatoare automate vol. I şi II*, curs lito, Universitatea Tehnică Timişoara, 1986.
13. Eugen Ioan Gergely, Helga Silaghi, Viorica Spoiala, Laura Coroiu, Zoltan Tamas Nagy, *Automate programabile, Operare, programare, aplicatii*, Editura Universitatii din Oradea, Oradea 2009, ISBN 978-973-759-940-7, 265 pg.
14. Stefan Preitl, Radu-Emil Precup: *” Introducere in ingineria reglarii automate*”,curs, Editura Politehnica Timisoara 2001
15. Toma Leonida Dragomir: *” Elemente de teoria sistemelor ”*, vol.II, Editura Politehnica Timisoara 2007

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms 2. Design of automation schemes for technical processes. 3. Automation of a heating system with heat exchanger with several control loops.	Students receive laboratory papers at least one week in advance, study	1h/week

4. Study of standardized control algorithms with continuous action. Proportional transfer element. 5. Study of standardized control algorithms with continuous action. Study of the PI controller. 6. Study of standardized control algorithms with continuous action. Study of the PID controller. 7. 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	

Bibliography

1. D. Sas, *„Modelarea si simularea proceselor cu parametri distribuiti”*, Editura Galaxia Gutenberg, Cluj-Napoca, 2019, 98 pagini, ISBN: 978-973-141-804-9
2. J. Love , *„Proces Automation Handbook”*, Editura Springer, 2007
3. Coroiu Laura, *Modelare şi simulare*, Îndrumător de laborator
4. www.mathworks.com

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 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.	80 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	**Test + practical application** At each laboratory students receive a test and a grade. Each	20%

	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	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 Minimum performance standard:

Course:

Understanding automation components
Understanding the operation and use of different automation equipments
Participation to at least half of the courses

Laboratory:

Ability to design and read an automatic diagram
Ability to design and verify any automated process
Ability to implement standardized control algorithms in order to obtain the desired parameters
Participation to all laboratory work

Completion date
26.05.2021

Course holder
Sl.dr.ing.Diana Sas
E-mail: dsas@uoradea.ro

Date of endorsement in the department:

Head of Department
Prof.dr.ing. Helga Silaghi
E-mail:hsilaghi@uoradea.ro

Date of endorsement in the Faculty Board:

Dean:
Prof.univ.dr. ing. Mircea Gordan
E-mail: mgordan@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 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 Sas**				
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 video projector, on the board or online	6h
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	**Oral presentation** Following the presentation at the laboratory completed during the	30%

	purpose of the paper, the content and requirements of the experimental part; For 10: detailed knowledge of how to perform all laboratory work.	semester, each student receives a grade.	
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.			

Completion date:
04.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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. 2. Introduction to the Matlab - Simulink simulation environment, with applications in electric drives 3. Use of the Simulink program to simulate drives with direct current and separate excitation machines 4. Methods and schemes for starting the DC motors 5. The study of an electric drive system with DC motors powered by PWM converter 6. Simulation of the operation of a DC motor system powered by VTC, closed circuit 7. Study of an electric drive system with d.c. motor controlled with PLC 8. Methods and schemes for starting asynchronous motors 9. Starting with resistors in the rotor circuit of asynchronous machines with coiled rotor 10. Changing the speed of drives with asynchronous machines by changing the frequency of the supply voltage 11. 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 4 h 4 h 2 h 2 h 4 h 2 h 2 h 2 h
Bibliography 1. SILAGHI H.,SPOIALĂ V.,COSTEA C. - *Acţionări electrice* , Îndrumar de laborator, Lito Universitatea din Oradea, 2008 2. 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 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: 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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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 1. Silaghi H.,SpoialĂ V.,Costea C. - *Acţionări electrice* , Îndrumar de laborator, Lito Universitatea din Oradea, 2008 2. 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
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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
Cap.2. ACTIVE COMPONENTS OF ELECTRO-HYDRAULIC AUTOMATIZATION EQUIPMENT.		4h
Cap.3. APPLICATIONS OF ELECTRO-HYDRAULIC AUTOMATIZATION EQUIPMENT. Case studies.		6h
Cap.4. PASSIVE COMPONENTS AND CIRCUITS OF PNEUMATIC AUTOMATIZATION EQUIPMENT.		4h
Cap.5. ACTIVE COMPONENTS OF ELECTRO-PNEUMATIC AUTOMATIZATION EQUIPMENT.		4h
Cap.6. APPLICATIONS OF ELECTROPNEUMATIC AUTOMATIZATION EQUIPMENT. Case studies.		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. 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.	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
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	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	70 %

	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 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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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 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.
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.	Free exposure,	8

4.1. Classification criteria for linear systems models. 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.	with the 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 hidrodinamic*e, 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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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,	2 h

	with the presentation on-line	
Chapter 9. Selling prices	Free exposure, with the presentation on-line	2 h
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
9. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu**,** Liliana Doina, **Finanţe şi credit (note de curs)**, Editura Universităţii din Oradea, 2011, CD-ROM
10. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu, Liliana Doina**, Finanţe şi credit (aplicaţii pentru seminar)**, Editura Universităţii din Oradea, 2011, CD-ROM
11. Nagy, Ştefan; Rada, Ioan Constantin, **Sisteme avansate de producţie (note de curs)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM
12. Nagy, Ştefan; Rada,Ioan Constantin, **Sisteme avansate de producţie (aplicaţii)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Paper: Consumer concepts 2. Report: About resources	Students receive homework for the seminar papers or	2 h 2 h

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	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
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.			

Completion date: 11.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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			**As. Prof. PhD Alexandru Bara**				
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 1.		
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 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
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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**Microcontrollers in automation**					
2.2 Holder of the subject		**Lect. PhD eng. Viorica Spoială**					
2.3 Holder of the academic laboratory/project		**Lect. PhD eng. Viorica Spoială**					
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of the evaluation	**Ex**	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	**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	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	4
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	Knowledge of microprocessors, computer programming, digital and analogic 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/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	**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

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 with different types of microcontrollers used in the digital control devices of industrial processes.
7.2 Specific objectives	• The course aims to present the theoretical elements of the microcontrollers, in order to understand the working principle of these. • The laboratory familiarizes students with practical aspects of the operation of the digital controlled systems, with Intel and ATMega (Arduino Uno board) microcontrollers, the programming mode, in assembly language and C, for some examples of simple processes.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction in microcontrollers - a short history - architecture - classification - types of microcontrollers	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
2. 8051 and 8xC552 microcontrollers - general characteristics and pins configuration - internal structure (ROM and RAM memory organization, SFR registers, timers/counters, serial interfaces, interrupting system, digital I/O ports, external memory, instructions, programming in assembly language)	Free exposure, with the presentation of the course with video projector, on the board or online	16 h
3.PIC microcontrollers – an overview - general characteristics and pins configuration - internal structure (ROM and RAM memory organization, SFR registers, timers/counters, serial interfaces, interrupting system, digital I/O ports, external memory, instructions)	Free exposure, with the presentation of the course with video projector, on the board or online	4 h
4.AVR microcontrollers – an overview - general characteristics and pins configuration - internal structure (ROM and RAM memory organization, SFR registers, timers/counters, serial interfaces, interrupting system, digital I/O ports, external memory, instructions)	Free exposure, with the presentation of the course with video projector,	4 h

	on the board or online	
Total		**28 h**

Bibliography
l. Viorica Spoială**, Microcontrolere în automatizări,** curs în format electronic, 2021
2. Liviu Toma, **Microcontrolere**, Editura Orizonturi Universitare, Timișoara, 2001
3.**** **80C51 8-bit microcontroller family**, Data Sheet, Philips Semiconductors, 2000
4.**** **Intel MCS® 51 Microcontroller Family User's Manual**, 1994
5.Muhammad Ali Mazidi, Rolin D. McKinlay, Danny Causey, **PIC Microcontroller and Embedded Systems Using Assembly and C for PIC18**, Prentice Hall, 2008
6.Muhammad Ali Mazidi, Sarmad Naimi, and Sepehr Naimi, **The AVR Microcontroller and Embedded Systems Using Assembly and C**, Prentice Hall, 2011.
7.http://learn.mikroe.com/ebooks/8051programming/front-matter/introduction/
8. http://www.mikroe.com/mikroprog/8051/
9.http://www.microcontrollerboard.com/pic_microcontroller.html
10.https://www.edgefx.in/pic-microcontroller-architecture-and-applications/
11.http://academic.cankaya.edu.tr/~o.gazi/PICbook.pdf
12.http://learn.mikroe.com/ebooks/picmicrocontrollersprogramminginassembly/chapter/pic16f887-microcontroller-device-overview/

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms. PD552 development board.	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. Internal memory, Special Function Registers of 80C51 Intel microcontroller. Applications in assembly programming		6 h
3. Timers/Counters 0 and 1 of the 80C51 Intel microcontroller. Applications in assembly programming		4 h
4. Interrupting system of the 80C51 Intel microcontroller. Applications in assembly programming		2 h
5. Low energy consumption modes of the 80C51 Intel microcontroller. Applications in assembly programming		2 h
6. I/O digital ports of the 80C51 Intel microcontroller. Applications in assembly programming		2 h
7. Practical applications with Arduino Uno Board		8 h
8. Recoveries and closing the situation at the laboratory.		2 h
Total		**28 h**

Bibliography
1. Viorica Spoială, **Microcontrolere in automatizări**, îndrumător de laborator în format electronic, 2021
2. Nagy Zoltan Tamas, Eugen Gergely, Adrian Codoban, **Microcontrolere in automatizări**, lucrări de laborator, Univ. Oradea, 2005
3. ***** Placa de dezvoltare PD552 – Ghid de operare, PTC S.A. Filiala Timișoara
   ***** Placa de dezvoltare Arduino Uno

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 study program of other university centers that have accredited this specialization (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) and knowledge of the types of microcontrollers, their working principles and programmming are very important requirements of employers in the field (Nidec, 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 (grade 5): in accordance with the minimum performance standard it is necessary to know the fundamental concepts 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 many subjects of theory and applications from all the courses.	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.	40%
10.6 Minimum performance standard: Course: Knowledge of component elements, including the detailed working principles of them, knowledge of the main architectures of microcontrollers Participation at least a half of courses. Laboratory: The ability of conception the connections of microcontroller board to the controlled systems, the ability of performing application programs for microcontroller systems. 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.			

Completion date:
16.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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			**Modelling, identification and simulation**				
2.2 Holder of the subject			**Lect. PhD eng. Coroiu Laura**				
2.3 Holder of the academic laboratory			**Lect. PhD eng. Coroiu Laura**				
2.4 Year of study	**III**	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	**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 academiclaboratory	**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	20
Tutorials	2
Examinations	9
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**140**
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	- 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	• Familiarizing students with mathematical models related to a given system with continuous or discrete time • Familiarization of students with the elements of analog simulation of systems through transfer elements and regulators. • Familiarization of students with system stability
7.2 Specific objectives	• The course aims to present the mathematical models of systems with continuous or discrete time • The laboratory familiarizes students with practical aspects regarding the mathematical modeling of a physical process with continuous or discrete time and the simulation of its functioning using the advanced techniques offered by the MATLAB-SIMULINK package.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Basics of systems modeling and simulation	Free exposure, with the presentation of the course with video projector, on the board or online	6h
2. Mathematical modeling of continuous time systems in operation	Free exposure, with the presentation of the course with video projector, on the board or online	8h
3. Study of system stability	Free exposure, with the presentation of the course with video projector, on the board or online	8h
4. Discrete time dynamic systems	Free exposure, with the presentation of the course with video projector, on the board or online	6h
Bibliography		

1. **Laura Coroiu**, Eugen Ioan Gergely: "*Modelarea si simularea sistemelor*", curs, Editura Universităţii din Oradea, 2010.
2. Ioan Dumitrache, Automatica, vol. 1, Editura Academiei Române 2009
3.Toma Leonida Dragomir: *" Elemente de teoria sistemelor "*, vol.I, Editura Politehnica Timisoara 2004
4. Toma Leonida Dragomir: *" Elemente de teoria sistemelor "*, vol.II, Editura Politehnica Timisoara 2007
5.Karl J. Astrom, Bjorn Wittenmark: "*Computer Controlled Systems.Theory and design*" Third edition, Prentice Hall, Upper Saddle River, New Jersey 07458, 1997

8.2 Academic Laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory and works 2. Mathematical modeling of physical systems continuously through the analytical method. 3. Introduction of physical systems models with continuous time and transformations between models using MATLAB. 4. Simulation of signals and processes using the MATLAB environment. MATLAB functions used in automation. Calculation of the time response of linear systems 5. Systems modeling and simulation with serial, parallel and feedback interconnections, with the help of MATLAB. 6. Mathematical modeling and simulation systems with interconnections part.I. 7. Mathematical modeling and simulation systems with interconnections part.II. 8. Analysis of the stability of automatic systems by the distribution method pole-zeros, using MATLAB 9. Tracing the location of the roots, using MATLAB. 10. Modeling of frequency characteristics, with the help of MATLAB. 11. . Mathematical modeling and simulation of discrete time systems 12. Mathematical modeling and simulation of a rod-trolley system (reverse pedul) 13. Mathematical modeling and simulation of a moving ball balance system 14. 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

Bibliography
Bibliografie

1. Coroiu Laura, Modelare şi simulare, Îndrumător de laborator, Editura Universităţii din Oradea 2014, CD-ROM Edition, pg94, ISBN 978-606-10-1473-6.
2. Marin Ghinea, Virgiliu Fireteanu, *MATLAB calcul numeri~grafica~aplicatii*, Editura Teora, 1995, ISBN 973-601-275-1

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 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 Modelling, identification and simulation 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.	60 %
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.	40%
10.6 Minimum performance standard: **Course:** - Ability to write the mathematical model for a system; - Ability to read an information block diagram; - Participation in at least half of the courses. **Laboratory:** - Ability to design and read an information block diagram; - Ability to calculate the mathematical model based on the equations of the system or the information block scheme; - Ability to model and simulate the operation of a system based on the mathematical model; - Participation in all laboratory work.			

Completion date:
04.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	No. of hours/ Observations
1. Analog signals, closed loop control and intelligent modules	face to face or online interactive presentation	9 hours
2. Distributed systems	face to face or online interactive presentation	9 hours
3. Human-machine interface	face to face or online interactive presentation	6 hours
4. Practical aspects	face to face or online interactive presentation	18 hours
Bibliography 1. 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. 2. L. M. Thompson, Industrial Data Communications, 4th Edition, ISA, 2007.		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
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,	2 hours

	individual work	
4. Calculation of the coordinates of the characteristic points.	Interactive presentation, examples, individual work	2 hours
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	Knowledge assessment test	20%

	(grade 5): in accordance with the minimum performance standard -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:
07.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**Advanced Control Systems**					
2.2 Holder of the subject		**Lecturer Phd. eng. Sanda DALE**					
2.3 Holder of the academic seminar/laboratory/project		**Lecturer Phd. eng. Claudiu COSTEA**					
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	**5**	of which: 3.2 course	**3**	3.3 academic seminar/laboratory/project	-/2/-
3.4 Total of hours from the curriculum	**70**	Of which: 3.5 course	**42**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	70 h
Study using the manual, course support, bibliography and handwritten notes	42
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	**70**
3.9 Total of hours per semester	**140**
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 to all labs - The recovery of 2 labs 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 computer-controlled systems
7.2 Specific objectives	▪ The course has the aim to present the concepts related to specific concepts related to computer-controlled systems, their design methods and implementation ▪ During the lab, the students will get familiar with analysis and design methods of computer-controlled systems; students acquire operating skills on using specific functions from MATLAB+SIMULINK.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CAP 1. Introduction. 1.1. Control system structures 1.2. General structure of an computer-controlled system 1.3. Sampling methods 1.4. RIST method 1.5. Delayed systems sampling 1.6. Sampling through approximation methods	Free exposure, course presentation on video projector, on the board or online	9h
CAP 2. Analysis methods for computer-controlled systems 2.1. Stability analysis methods for computer-controlled systems 2.2. Controlability and observability analysis for computer-controlled systems 2.3. Robustness and sensibility for computer-controlled systems		9h
CAP 3. Design methods for computer-controlled systems 3.1. Design method by pole placement - state-space approach 3.2. Design method by pole placement – polynomial approach 3.3. Linear-quadratic design		15h
CAP 4. Implementation issue related to computer-controlled systems 4.1. Issues on implementation on computer for numeric algorithms 4.2. Issues on process interface 4.3. Numerical automatic equipments		9h

Bibliography

1. **S. Dale,** *Analiza şi sinteza sistemelor de reglare numerice***,** notiţe de curs în format electronic disponibile pe www.sdale.webhost.uoradea.ro.
2. **K.J. Åström, B. Wittenmark,** *Computer controlled system*, Prentice Hall, 1997.
3. **T.L. Dragomir,** *Teoria sistemelor, vol. I şi II***,** Editura Politehnica, Timişoara, 2004.
4. **C. Popescu, D. Popescu, S. Dale,** *Ingineria reglării automate***,** curs lito, Universitatea din Oradea, 2001

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Laboratory structure presentation.	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
2. CTS sampling with ZOH – state-space approach		2h
3. CTS sampling with ZOH – I/O approach		2h
4. Stability study for computer-controlled systems through stability criteria		2h
5. Stability study for computer-controlled systems through root locus method		2h
6. Controlability and observability study for computer-controlled systems		2h
7. State-space feedback design for a positioning mechanism (computer-controlled approach)		2h
8. State-space observer design for a positioning mechanism (computer-controlled approach)		2h
9. Configuring an acquisition system using xpc target toolbox		2h
10. Computer-controlled system design for a a m.c.c, with PID controller		2h
11. Computer-controlled system design for a m.c.c. in polynomial approach		2h
12. Computer-controlled design for a thermic process, with PID controller		2h
13. Computer-controlled design through linear-quadratic method for a 2-axis mill		2h
14. Activity evaluation for the laboratory.		2h

Bibliography

1. **S. Dale**, Sisteme de reglare avansate, 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 computer-controlled systems 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 computer-controlled systems using MATLAB+SIMULINK For 10: analysis and design for complex computer-controlled systems using MATLAB+SIMULINK	**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%
10.7 Project			
10.8 Minimum performance standard: Course: - Knowledge of specific issues related to computer-controlled system approach, design and implementation methods, at conceptual level - Ability to use the methods of analysis and design methods for computer-controlled systems for processes. Academic seminar: Laboratory: - Skills regarding: analysis and design for computer-controlled system using computer-aided design methods and MATLAB+SIMULINK specific functions - Ability to understand how to addapt a system to the computer-controlled approach Project:			

Completion date: 07.09. 2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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		**Automatic Systems Reliability**					
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	**7**	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	58 h
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	4
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 algebra, mathematical analysis, computer programming, modeling and simulation, system theory, control engineering
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	- Students have to pick-up the project theme - The students have to participate to all the project phases - project 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. **C4.** Design, implementation, testing, use and maintenance of general-purpose systems and dedicated equipment, included computer networks for automation and applied informatics applications.
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. **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 have to acquire general knowledge of reliability and dependability, to create the competences and abilities necessary at reliability analyze and design for fault tolerant control systems and soft products
7.2 Specific objectives	▪ The course has the aim to present the concepts related to control systems quality, reliability and availability and of specific methods to analyze them ▪ Once the projects is developing, the students learn to apply reliability and availability analysis methods on control systems

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CAP 1. Quality concepts. Quality principles 1.1. Quality concepts 1.2. Quality concepts in engineering 1.3. Quality principles in engineering	Free exposure, course presentation on video projector, on the board or online	4h
CAP 2. Fundamental quality indicators 2.1. Fundamental quality indicators for non-reparable systems 2.2. Fundamental quality indicators for reparable systems		2h
CAP 3. Distribution laws		2h
CAP 4. Systems reliability 4.1. Issues in reliability modeling 4.2. Reliability models		2h
CAP 5. Systems availability 5.1 Reparable systems 5.2. Markov modeling 5.3. Discrete Markov modeling		2h
CAP 6. Faults and causes of faults 6.1. Faults classification 6.2. Causes of faults 6.3 Common ground faults 6.4. Fault intensity 6.5. Fault tolerant systems		6h

CAP 7. Reliability/availability in control systems 7.1. Reliability/availability for PLC 7.2. Reliability of software products 7.3. Specific reliability issues for simulation software 7.4. Human factor reliability	Free exposure, course presentation on video projector, on the board or online	4h
CAP 8. Quality and reliability in design and implementation phases 8.1. Design in terms of quality 8.2. Design in terms of reliability 8.3. Testing from the quality and reliability point of view		4h
Bibliography **1. S. Dale**, *Fiabilitatea sistemelor automate*, notiţe de curs. **2. W. Goble**, *Evaluating Control Systems Reliability – Techniques and Applications*, Instrument Society of America – Resources for Measurement and Control Systems, 1995. **3. J.P. Bentley,** *Introduction to Reliability and Quality Engineering*, Addison Wesley Longman, 1999. **3. C. Popescu, D. Popescu,** *Fiabilitatea şi testabilitatea sistemelor digitale*, MatrixRom, Bucureşti, 2001. **4. Isaic-Maniu, ş.a,** *Calitate şi Fiabilitate, manual practic*, vol.I şi II, Editura Tehnică, 1988.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Presentation of the project theme: Reliability evaluation for a complex control system	Students receive the theme of the project and the design methodology and they go through the stages of the project	1h
2. Fundamental indicators to appreciate systems quality		1h
3. Control system reliability calculus (reliability schemes, typical reliability models, methods to evaluate complex systems reliability)		1h
4. Control system reliability evaluation: - reliability scheme of the project - reliability evaluation on 3 methods (event space method, tie method and cut method)		2h 3h
5. Software development for reliability calculus		4h
6. Projects evaluation		2h
Bibliography 1. **S. Dale**, Fiabilitatea sistemelor automate, îndrumător de proiectare, 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 approach of specific control systems issues from the quality and reliability point of view 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	-		

10.7 Project	Minimum required conditions for passing the examination (grade 6): in accordance with the minimum performance standard: completion of all design stages, without software development For 10: going through all the design stages, with the completion of the calculations and the simulation program	**Oral presentation** Based on the presentation of the project carried out during the semester (in front of their colleagues and the teacher), the student is evaluated and receives a grade. The evaluation can be done face to face or online.	30%
10.8 Minimum performance standard: Course: - Knowledge of concepts related to the quality and reliability of an engineering product as well as the usual methods of analyzing its reliability and availability; - Ability to draw up reliability schemes appropriate to each system and to carry out the necessary calculations on them for reliability analysis; - Ability to identify solutions to improve the quality of engineering products. Academic seminar: Laboratory: Project: - Skills regarding: analysis of a complex engineering product, in terms of reliability and availability; - Ability to adopt superior solutions in terms of reliability and availability.			

Completion date: 07.09. 2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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 online	2h
CAP 7. Aspects related to neural control 7.1. Modeling and identification based on ANN 7.2. Neural control		4h
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	**Lab tests and results presentations** Every lab will end with a result presentation and a test. All of these will be	30%

	performance standard: analysis and design for simple knowledge-based control systems using MATLAB+SIMULINK For 10: analysis and design for complex knowledge-based control systems using MATLAB+SIMULINK	presented at the end and graded. The evaluation can be done face to face or online.	
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:			

Completion date: 07.09. 2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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. Sas 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	- 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. **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.

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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

1. T., Barabas, T., Vesselenyi, **Robotică – Conducerea şi programarea roboţilor industriali – Probleme şi metode de bază**, Editura Universităţii din Oradea, 2004
2. T., Vesselenyi, T., Barabas, **Comanda roboţilor. Aplicaţii**, Editura Universităţii Oradea, 2006;
3. B., Lantos, **Robotok Irányitása**, Akademiai Kiado, Budapest, 1991
4. Lăcrămioara Stoicu -Tivadar, **Programarea roboţilor industriali şi a maşinilor unelte cu comandă numerică** - *curs*, Universitatea "Politehnică" Timişoara, 1996
5. 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. 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.	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
Bibliography 1. 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	**Written exam** Students receive for solving each a form with 3 subjects of theory and an application.	60 % (6 points out of 10)

	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 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% (2 points out of 10)
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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**MANAGEMENT**					
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	**IV**	2.5 Semester	**7**	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	**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					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	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Course knowledge: Fundamentals of Economics, General Economics (Microeconomics), Managerial Communication, Accounting, Finance and Credit, Law
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 seminary/laboratory/project	- mandatory presence at all seminar hours; - students come with observed laboratory papers - a maximum of 3 laboratories can be recovered during the semester (30%);

	- attendance at laboratory hours below 70% leads to the restoration of the discipline - the laboratory can be carried out face to face or online

6. Specific skills acquired	
Professional skills	C6. Application of knowledge of legislation, economics, marketing, business and quality assurance, in economic and managerial contexts
Transversal skills	**CT1.**Responsibly apply the principles, norms and values of professional ethics in the accomplishment of professional tasks and identify the objectives to be achieved, the available resources, the work stages, the execution durations, the accomplishment terms and the afferent risks. **CT2**. Defining the activities in stages and distributing them to the subordinates with the complete explanation of the duties, according to the hierarchical levels, ensuring the efficient exchange of information and interpersonal communication.

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

7.1 The general objective of the subject	Familiarizing students with theories on the basics of general management
7.2 Specific objectives	The course aims to form the necessary discernment for the objective assessment and retention by students of the general management issues.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Defining management	Free exposure, with the presentation on-line	2 h
Chapter 2. Classical and contemporary industrial management	Free exposure, with the presentation on-line	2 h
Chapter 3. Management development in Romania	Free exposure, with the presentation on-line	2 h
Chapter 4. Management functions	Free exposure, with the presentation on-line	2 h
Chapter 5. Company and environment	Free exposure, with the presentation on-line	2 h
Chapter 6. Management information system	Free exposure, with the presentation on-line	2 h
Chapter 7. The decision-making process in the company	Free exposure, with the presentation on-	2 h

	line	
Chapter 8. Production costs	Free exposure, with the presentation on-line	2 h
Chapter 9. Elaboration of the organizational management structure in the company	Free exposure, with the presentation on-line	2 h
Chapter 10. Conceptual approaches regarding company strategies and methods	Free exposure, with the presentation on-line	2 h
Chapter 11. Specific management techniques	Free exposure, with the presentation on-line	2 h
Chapter 12. Specific management techniques	Free exposure, with the presentation on-line	2 h
Chapter 13. Management team	Free exposure, with the presentation on-line	2 h
Chapter 14. Planning and organizing the working time of the management staff	Free exposure, with the presentation on-line	2 h
Total		**28 h**

Bibliography

1. Rada, Ioan Constantin; Măgdoiu, Liliana Doina, **Management general**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2009, CD-ROM
2. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu, Liliana Doina, **Tehnici de negociere**, Editura Universităţii din Oradea, 2011, CD-ROM
3. Lazăr, Ioan et. Comp., **Management General**, Ed. Risoprint, Cluj-Napoca, 2004
4. Măgdoiu, Liliana Doina, **Management si Comunicare în Ingineria Economică**, Ed. CA Publishing, Cluj-Napoca, 2012
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
9. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu, Liliana Doina**, Finanţe si credit (note de curs)**, Editura Universităţii din Oradea, 2011, CD-ROM
10. Rada, Ioan Constantin; Rica Ivan; Măgdoiu, Liliana Doina**, Finanţe si credit (aplicaţii pentru seminar)**, Editura Universităţii din Oradea, 2011, CD-ROM
11. Ştefan Nagy, Ioan Constantin Rada, **Sisteme avansate de producţie (note de curs)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM
12. Ştefan Nagy, Ioan Constantin Rada, **Sisteme avansate de producţie (aplicaţii)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Paper: Management concepts 2. Report: Company organization 3. Paper: Motivation as a function of management	Students receive homework for writing papers or	2 h 2 h 2 h

4. Paper: The role of the environment in the company 5. Report: Management information system 6. Report: Substantiation of managerial decisions 7. Closing the situation at the laboratory	choose their homework at least a week in advance, study, design papers and support them in the laboratory. Appreciations and comments are made under the guidance of the teacher.	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 can be found in the curriculum of economic engineering specialization in electrical, electronic and energy fields from other university centers that have accredited these specializations ("Politehnica" University of Timisoara, Cluj-Napoca Technical University, 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-international flows at business level, the management of the 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	Periodic check Students receive pre-arranged topics for solving	100%

10.6 Minimum performance standard:

Course: - Elaboration of a professional project specific to the field of Engineering and Management using specific software systems and databases,

- Designing economic-financial processes at business level, for a given situation
- Elaboration of projects aimed at quality management in the electrical, electronic and energy fields,
- Participation in at least half of the courses.

Seminar: - Responsible realization, in conditions of qualified assistance, of projects for solving some problems specific to the field, with the correct assessment of the workload, of the available resources, of the necessary completion time and of the risks, in conditions of application of the deontological norms and of professional ethics in the field, as well as of safety and health at work.

- Participation in all laboratory work.

Completion date: 07.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

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			**Nonlinear Systems Control (IRA II)**				
2.2 Holder of the subject			**Ass. Prof. PhD Alexandru Bara**				
2.3 Holder of the academic laboratory/project			**Lect. PhD Claudiu Costea**				
2.4 Year of study	**III**	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	**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 academiclaboratory/project	**28/14**

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 control nonlinear 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. Phase Plane Analysis 1.1. Concepts of Phase Plane Analysis 1.2.Phase Plane Analysis of Linear Systems 1.3 Phase Plane Analysis of Nonlinear Systems 1.4 Existence of Limit Cycles	Free exposure, with the presentation of the course with video projector, on the board or online	4h
2. Fundamentals of Lyapunov Theory 2.1. Nonlinear Systems and Equilibrium Points 2.2. Concepts of Stability 2.3 Linearization and Local Stability 2.4 Lyapunov's Direct Methods 2.6 Systems Analysis Based on Lyapunov's Direct Method 2.7 Control Design Based Lyapunov's Direct Method	Free exposure, with the presentation of the course with video projector, on the board or online	6h
3. Advanced Stability Theory 3.1. Concepts of Stability for Non-Autonomous Systems 3.2. Lyapunov Analysis of Non-Autonomous Systems 3.3. Instability Theorems 3.4 Lyapunov – like Analysis using Barbalat's Lema 3.5 Absolute Stability	Free exposure, with the presentation of the course with video projector, on the board or online	4h

4. Describing Function Analysis 4.1. Describing Function Fundamentals 4.2.Describing Functions of Common Nonliniarities 4.3. Describing Function Analysis of Nonlinear Systems	Free exposure, with the presentation of the course with video projector, on the board or online	6h
5. Feedback Linearization 5.1 Intuitive Concepts 5.2 Input-State Linearization of SISO Systems 5.3 Input-Output Linearization of SISO Systems	Free exposure, with the presentation of the course with video projector, on the board or online	6h
6. Sliding Control 6.1 Sliding Surfaces 6.2 Continuous Approximations of Switching Control Laws	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Bibliography 1. Voicu, M , Tehnici de analiza a stabilitatii sistemelor automate 2. Slotine, J. Applied Nonlinear Control, Pretince Hall 3. Bara, A., Ingineria Reglarii Automate		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
		28h
Bibliography 1.		
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	10.3 Percent from the

		The evaluation can be done face-to-face or online	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 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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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			**Ass. Prof. PhD Alexandru Bara**				
2.3 Holder of the academic laboratory/project			**Lect. PhD Claudiu Costea**				
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

1. Evans, L. An Introduction to Mathematical Optimal Control Theory,University of California, Berkeley

2. Robust Adaptive Control 3. Bara, A., Ingineria Reglarii Automate		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
		28h
Bibliography 1.		
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	**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%

	perform all laboratory work		
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. 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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h 2h

2.6. Analog inputs of data acquisition devices 2.7. Types of signal sources and connections for signals		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, Timişoara, 2003.

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[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 **1.** Gabriela Tont, *Interfețe de proces, Indrumator de laborator*, Editura Universitatii din Oradea. 2018 2. LabVIEW Getting Started manual, ediţiile pentru LabVIEW 7.1, 8.5, 8.6 şi2011 3. Baza de exemple LabVIEW 4. LabVIEW Help, manualele pentru versiunile 7.1, 8.5, 8.6, 2010 şi 2011 ale LabVIEW. 5. 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	**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%

	necessary functions for the realization of the virtual tools for the proposed applications, which will run and will fulfill the set objectives. 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.			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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		**Robotics**					
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	**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/-**
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	22
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	28
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**84**
3.9 Total of hours per semester	**140**
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 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	**CP4.** Design, implementation, testing, use and maintenance of industrial robot systems, through dedicated equipment (e.g. robot controller), for automation applications (e.g. programming industrial robots for automation of parts handling in CIM cells/manufacturing systems).
Transversal skills	**TC2.** Identification of roles and responsibilities in a pluri specialized 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 or 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, with the basic theoretical and practical knowledge about the use of industrial robots. This knowledge can be a real help for graduates from the specialization Automation and applied informatics, to their integration into industrial production systems with robots.
7.2 Specific objectives	• The course aims to present theoretical elements related to the structure, basic kinematic models, programming and integration of industrial robots into Cells/Manufacturing systems. • The laboratory familiarizes students with practical aspects of programming industrial robots for automation parts handling operations in cells/manufacturing systems.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Cap1.General structure of industrial robots. Cap2.Classification of industrial robots. Cap3.Basic geometric models of industrial robots. Cap4.Modeling the external environment. Cap5.Programming of industrial robots. Cap6.Mobile robots. Automatically guided vehicles. Course scheduling: 1. Structure of the mechanical system: trajectory generating mechanism, orientation, final effector. 2. Structure of the control system and the drive system. Basic robot system. 3. Classification of industrial robots by drive system: hydraulically operated, pneumatic-operated and electric-operated robots. 4. Classification of industrial robots by control system: robots with sequential control, point-by-point control, multipoint control and continuous trajectory control. 5. Robots with automatic control: with closed loop adjustment and open loop adjustment. 6. Geometric pattern of an industrial robot. Denawit-Hartenberg Convention. Homogeneous transformations.	Free exposure, with the presentation of the course with video projector, on the board or online	2h 2h 2h 2h 2h 2h

7. Homogeneous transformation matrices. Case study. 8. The problem of the development of the direct geometric model and the reverse geometric model. Case study. 9. Modelling the environment in the event of a robotic technological process. 10. Programming of industrial robots. Definition of programming methods. Programming languages and their classification. 11. Examples of level 1, 2 and 3 robot programming languages. Applications. 12. Examples of level 3, 4 and 5 robot programming languages. Applications. 13. Mobile robots. Automatically guided vehicles. 14. Mobile robots. Case studies.		2h 2h 2h 2h 2h 2h 2h 2h
Bibliography 1. T., Barabas, T., Vesselenyi, **Robotică – Conducerea şi programarea roboţilor industriali – Probleme şi metode de bază**, Editura Universităţii din Oradea, 2004 2. T., Vesselenyi, T., Barabas, **Comanda roboţilor. Aplicaţii**, Editura Universităţii Oradea, 2006; 3. B., Lantos, **Robotok Irányitása**, Akademiai Kiado, Budapest, 1991 4. Lăcrămioara Stoicu -Tivadar, **Programarea roboţilor industriali şi a maşinilor unelte cu comandă numerică** - *curs*, Universitatea "Politehnică" Timişoara, 1996 5. Fr., Kovács, C., Rădulescu, **Roboţi industriali**, Universitatea Tehnică din Timişoara, 1992.		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
Laboratory work is carried out within an educational CIM system. The structure, operation and programming of an industrial Mitsubishi RV-M1 robot with electric drive is studied. 1. Presentation of the laboratory and the labor protection norms. 2. Structure of the micro-robot system RV-M1. 3. Manual control of the RV-M1 robot. 4. Programming the RV-M1 robot to perform a handling operation. 5. Programming the movement of the RV-M1 robot on Slide. 6. Programming the RV-M1 robot for the service of VISION 2000 station. 7. Programming the RV-M1 robot for the service NCL2000 station. 8. Programming the RV-M1 robot to perform an assembly operation. 9. Control of parts with the RV-M1 robot using two-dimensional palletization. 10. Multipoint command of the RV-M1 robot. 11. Control of conditional movements on the RV-M1 robot. 12. Control a mobile robot equipped with Arduino development system. 13. Control a mobile robot equipped with Raspberry Pi development system. 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
Bibliography 1. T., Barabas, **Robotică –Roboţi industriali**, Îndrumător de laborator, Universitatea din Oradea, 2005		

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/programming of industrial robots, for the automation of parts handling operations in cells/manufacturing systems of type CIM.			

Completion date:
09.09.2020

Date of endorsement in the department:
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Date of endorsement in the Faculty Board:
28.09.2020