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 Electronics and Telecommunications**
1.4 Field of study	**Electronical Engeneering, Telecommunications And Information Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**Applied Informatics**				
2.2 Holder of the subject			**Lect. dr. eng. Țepelea Laviniu**				
2.3 Holder of the academic seminar/laboratory/project			**Assoc. As. PhD. Stud. Marcu David**				
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	5	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1/2/-
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/ 28/-

Distribution of time	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	8
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	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with computer, appropriate software and video projector, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the situation of the Covid pandemic

5.2.for the development of the academic seminary/laboratory/project	Laboratory room equipped with computers and dedicated software, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the situation of the Covid pandemic

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used.
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	▪ identifying computer hardware ▪ deepening knowledge of Windows and Linux operating systems ▪ advanced use of Office software (Word, Excel, PowerPoint, etc.) ▪ knowledge and use of simulation programs in the field of electronics
7.2 Specific objectives	▪ creation of an office document at professional and scientific level ▪ making flowcharts and electronic diagrams using the Microsoft Visio program ▪ observation compared to the main elements and how to work the system they Windows and Linux ▪ installation and use of an electronic simulation program ▪ reading and writing a program in a microcontroller with the help of a programmer

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introductory notions. Operating systems. DOS operating system	Lecture. Explication. Description. Exemplification.	2
2. Windows operating system. Linux operating system	Lecture. Explication. Description. Exemplification.	2
3. Microsoft Office. Microsoft Word	Lecture. Explication. Description. Exemplification.	2
4. Microsoft Excel	Lecture. Explication. Description. Exemplification.	2
5. Microsoft PowerPoint	Lecture. Explication. Description. Exemplification.	2
6. Microsoft Visio	Lecture. Explication. Description. Exemplification.	2

7. Simulation programs in electronics. Multisim	Lecture. Explication. Description. Exemplification.	2
8. Proteus Design Suite	Lecture. Explication. Description. Exemplification.	2
9. LTspice	Lecture. Explication. Description. Exemplification.	2
10. Programming a microcontroller.	Lecture. Explication. Description. Exemplification.	2
11. Using the PonyProg program	Lecture. Explication. Description. Exemplification.	2
12. Use of programming tools from Mikroelektronika	Lecture. Explication. Description. Exemplification.	2
13. Using Microchip programming tools	Lecture. Explication. Description. Exemplification.	2
14. Arduino IDE	Lecture. Explication. Description. Exemplification.	2

Bibliography

1. I. Gavriluț, L. Țepelea, *Use of computers - Theory and Applications* , Univ. from Oradea, 2007.
2. I. Gavriluț, L. Țepelea, *Use of computers - Laboratory guide* , Univ. from Oradea, 2006
3. Schwartz, Steve, *Microsoft Office 2007. Quick visual guide* , Niculescu Publishing House, 2009.
4. ***, Word 2010: Advanced. Student manual, ILT Series, Axzo Press, USA
5. Kate Shoup, Simplified Office 2010, Wiley Publishing, Indianapolis, 2010
6. Multisim - User manual
7. Proteus Design Suite - User Manual
8. LTSpice - User Manual

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Block diagram of a computer system	Discussions, exemplification, computer operation, teamwork	2
2. DOS commands	Discussions, exemplification, computer operation, teamwork	2
3. Comparison between Windows and Linux operating systems	Discussions, exemplification, computer operation, teamwork	2
4. Installing Windows and Linux operating systems	Discussions, exemplification, computer operation, teamwork	2

5. Preparation of an Office document at professional and scientific level	Discussions, exemplification, computer operation, teamwork	2
6. Types of simulation in electronics programs	Discussions, exemplification, computer operation, teamwork	2
7. Presentation of other electronics programs	Discussions, exemplification, computer operation, teamwork	2
8.3 Laboratory		
1. Computer components. DOS commands	Description. Explication. Exemplification. Verification.	2
2. Windows operating system. Linux operating system	Description. Explication. Exemplification. Verification.	2
3. Editing with Word	Description. Explication. Exemplification. Verification.	2
4. Applications in Excel	Description. Explication. Exemplification. Verification.	2
5. Excel application for PSF calculation	Description. Explication. Exemplification. Verification.	2
6. Making PowerPoint presentations	Description. Explication. Exemplification. Verification.	2
7. Making flowcharts and electronic diagrams in Visio	Description. Explication. Exemplification. Verification.	2
8. Realization and simulation of electronic schemes in Multisim	Description. Explication. Exemplification. Verification.	2
9. Realization and simulation of electronic schemes in Proteus	Description. Explication. Exemplification. Verification.	2
10. Realization and simulation of electronic schemes in LTSpice	Description. Explication. Exemplification. Verification.	2
11. Reading and writing memos with PonyProg2000	Description. Explication. Exemplification. Verification.	2
12. Use of Mikroelektronika programming tools	Description. Explication.	2

	Exemplification. Verification.	
13. Using Microchip programming tools	Description. Explication. Exemplification. Verification.	2
14. Retrieval and verification of knowledge	Description. Explication. Exemplification. Verification.	2

Bibliography

1 . I. Gavriluț, L. Țepelea, *Use of computers - Theory and Applications* , Univ. from Oradea, 2007.
2 . I. Gavriluț, L. Țepelea, *Use of computers - Laboratory guide* , Univ. from Oradea, 2006
3 . Schwartz, Steve , *Microsoft Office 2007. Quick visual guide* , Niculescu Publishing House , 2009.
4. ***, Word 2010: Advanced. Student manual, ILT Series, Axzo Press, USA
5. Kate Shoup, Simplified Office 2010, Wiley Publishing, Indianapolis, 2010
6. Multisim - User manual
7 . Proteus Design Suite - User Manual
8. LTSpice - User Manual

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	- correctness and completeness of knowledge, - logical coherence	- written assessment or grid test in case of online assessment	50%
10.5 Academic seminar	- the ability to understand concepts presented	- computer operation or screen presentation in the online situation	10%
10.6 Laboratory	- the capacity and the way of realization and understanding of the practical applications	- computer operation or screen presentation in the online situation	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining a grade of 5 in each laboratory test; fulfilling the requirements imposed by each laboratory work . **Knowledge for graduate:** Creating a Word document at a professional and scientific level. Basic use of an electronics simulation program.			

Completion date:
16.09.2022

Lect. dr. eng. Țepelea Laviniu
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Assoc. As. PhD. Stud. Marcu David
david@marcunet.com

Date of endorsement
in the department:
19.09.2022

Departament director,
Prof. dr. eng. Nistor Daniel Trip
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Date of endorsement
in the Faculty Board:

23.09.2022

Dean,
Prof. dr. eng. habil. Ioan Mircea Gordan
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https://prof.uoradea.ro/mgordan/

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 Electronics and Telecommunications**
1.4 Field of study	**Electronics Engineering, Telecommunications and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics**

2. Data related to the subject

2.1 Name of the subject			**Computer Programming and Programming Languages**				
2.2 Holder of the subject			**S.L. dr. ing. Florin Vancea**				
2.3 Holder of the academic seminar/laboratory/project			**S.L. dr. ing. Florin Vancea**				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of evaluation	VP	2.7 Subject regime	I

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	19
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	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	2
Tutorials	1
Examinations	3
Other activities.	

3.7 Total of hours for individual study	**19**
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	Video-projector, whiteboard or online platform. Course can be face-to-face or online.
5.2.for the development of the academic seminary/laboratory/project	Computer networks laboratory, with specific equipment or online resources. Seminary/laboratory/project can be face-to-face or online

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for signals acquisition and processing:** - Using specific methods and instruments for signal analysis. - Designing basic functional blocks for digital signal processing with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods regarding computing systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Description of general operation of a computer, basic principles of general-purpose microprocessor and microcontroller architecture, of structured programming general principles. - Using general-purpose programming languages and specific languages for microprocessors and microcontrollers. Operation explanation for automated control systems which use those architectures and interpretation of experimental results. - Solving practical problems which include data structure and algorithms, programming and using microprocessors and microcontrollers - Conception of programs in a general-purpose or specific language, starting from requirements up to execution. - Debugging and result interpretation correlated with the processor used. - Implementation of projects which involve hardware components (processors) and software (programming). **C4. Designing and using low-complexity hardware and software applications, specific for applied electronics:** - Defining concepts, principles and methods used in domains: computer programming, high-level languages, specific languages, CAD techniques for electronic modules, microcontrollers, computer architecture, programmable electronics systems, graphics, reconfigurable hardware architectures. - Explaining and interpreting the specific requirements for hardware and software structures in the fields: computer programming, high-level and specific languages, CAD techniques for electronic modules, microcontrollers, computer architecture, programmable electronics systems, graphics, reconfigurable hardware architectures. - Identification and optimization of hardware and software solutions of problems in : industrial electronics, medical electronics, telecommunications, automotive electronics, automation, robotics, large-scale manufacturing. - Using appropriate performance criteria for evaluation, including by simulation, of hardware and software for dedicated systems or of services where microcontrollers or low-complexity or medium complexity computing systems are used. - Designing of dedicated equipment in applied electronics or telecommunications, using microcontrollers, programmable circuits or simple computers, including associated programs.
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	Providing basic skills in computer programming
7.2 Specific objectives	Knowledge of computer structure Knowledge of basic elements for algorithmic and structured programming Knowledge of the basic elements for a high-level language Acquiring abilities for analyzing a problem and solving it using the computer Acquiring abilities for writing, executing, debugging a program written in a high-level language

8. Contents

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction. Reference hardware structure	Presentation, dialogue	2
Algorithms, logic diagrams	Presentation, dialogue	2
C program structure.	Presentation, dialogue	2
Storage of data in memory, data types, data types in C, variables.	Presentation, dialogue	2
Simple I/O instructions.	Presentation, dialogue	2
Assignment instruction.	Presentation, dialogue	2
Cyclical instructions.	Presentation, dialogue	2
Derivate data types – array, structures	Presentation, dialogue	2
Character string processing.	Presentation, dialogue	2
Subprograms – procedure, function, parameter passing	Presentation, dialogue	2
Variable visibility.	Presentation, dialogue	2
Modularization of large programs.	Presentation, dialogue	2
Files. Graphics elements.	Presentation, dialogue	2

Distributed processing elements. Internet.	Presentation, dialogue	2
Bibliography: 1. Programarea și utilizarea Calculatoarelor – curs, ș.l. Gianina Gabor, ș.l. Florin Vancea, Universitatea din Oradea, 1998 2. Programarea în limbajul C– curs, I.Mang, C.Gyorodi, R.Gyorodi,Universitatea din Oradea, 1995 3. The C Programming Language B. Kernighan, D. Ritchie Prentice Hall, 1998 ISBN 0-13-110362-9		
8.2 Seminar	Teaching methods	No. of hours/ Observations
8.3 Laboratory		
IDE.	Presentation, experiment	2
Simple linear programs in C	Presentation, experiment	4
Debugging	Presentation, experiment	2
FOR.	Presentation, experiment	2
WHILE.	Presentation, experiment	2
IF, SWITCH.	Presentation, experiment	2
Array data type.	Presentation, experiment	2
Structure data type.	Presentation, experiment	2
Sample program using fundamentals of C language.	Presentation, experiment	4
Procedures	Presentation, experiment	2
Functions	Presentation, experiment	2
Files	Presentation, experiment	2
8.4 Project	-	-
Bibliography: Indrumator de laborator PCLP, s.l. Vancea Florin, format electronic.		

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 discipline content in adapted to requirements from potential main employers for the students from this qualification

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Knows principles. Knows methods, algorithms, descriptions. Makes correct examples. Applies correctly the knowledge for extensions and new cases.	Written tests Evaluation can be face-to-face or online	60%
10.5 Seminar			
10.6 Laboratory	Active and complete participation to works. Knows the subject. Provides correct results, functional programs. Has initiative and creativity in execution.	Continuous, during each activity. Evaluation can be face-to-face or online	40%
10.7 Project			
10.8 Minimum performance standard: For 5: Knows basic data types, decision instructions, FOR instruction. Is able to write a simple program using those elements. For 10: Knows the subject presented during course, exposes them in correct and coherent form, good or very good activity at laboratory.			

Completion date: 09.09.2022

Course lead signature:
S.l.dr.ing. Vancea Florin
fvancea@uoradea.ro
http://fvancea.webhost.uoradea.ro

Lab/seminary lead signature:
S.l.dr.ing. Vancea Florin
fvancea@uoradea.ro
http://fvancea.webhost.uoradea.ro

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Department endorsement date
21.09.2022

Department Director
Conf. univ. dr. ing. Mirela Pater
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Client Academic Entity for Subject Description

Department endorsement date for
Department of Electronics and Telecommunications
21.09.2022

Department Director:
Prof.univ.dr.ing. Nistor Daniel Trip
Date de contact:
Tel.: 0259-408194, E-mail: dtrip@uoradea.ro

Faculty Board endorsement date
23.09.2022

Dean Signature
Prof.univ.dr.ing. Ioan Mircea Gordan
e-mail: mgordan@uoradea.ro
http://mgordan.webhost.uoradea.ro

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject			Computer programming and programming languages II				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	I	2.5 Semester	II	2.6 Type of the evaluation	Continuous Assessment	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	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					19 h
Study using the manual, course support, bibliography and handwritten notes					7
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					2
Tutorials					
Examinations					2
Other activities.					

3.7 Total of hours for individual study	19
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	projector
5.2.for the development of the academic seminary/laboratory/project	

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture.
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 is scheduled to be taught to first year students, Specialization: AE in the second semester. The course addresses programming techniques using Visual Studio 2019, simple variable declarations and arrays, list data structures, tree structures as well as data structure processing algorithms such as search problems in tables, sorting algorithms , memory optimization by using reunion structures, etc.
7.2 Specific objectives	**1. Knowledge and understanding** - knowledge and understanding of the notions of SDA **2. Explanation and interpretation** - explaining the mathematical apparatus used - interpretation of results - interpretation of specific formulas **3. Instrumental - applications** - development of abstraction skills - formation of calculation skills **4. Attitudinal** - developing a positive attitude - cultivating and promoting a scientific environment focused on values - forming a positive and responsible behavior

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8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Structured programming.	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture leaves room for student intervention for a better understanding of the notions presented by the teacher. The activity can also be carried out online.	2
2. Functions.		4
3. Pointers: variables, operations, transmission.		4
4. Pointers: connection to the boards, memory management, accessing through pointers.		4
5. Recursivity.		4
6. Strings, functions for characters and for strings.		4
7. ANSII standard and Unicode standard.		2
8. Processing of files.		2
9. Switching from structured programming to POO.		2

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 19992007
1. 3. M. Curila S. Curila, "*Programarea in C şi C ++*", Editura Universităţii din Oradea, 2008, 300 pagini, ISBN 978-973-759-554

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Functions.	The laboratory is organized in the first part of a short teacher-student debate on algorithms. Then the students will implement the algorithms, will note the results in their personal notebooks and will present them to the teacher. The activity can also be carried out online.	4
2. Pointers.		4
3. Recursivity.		4
4. Strings.		4
5. ANSII standard and Unicode standard.		4
6. Processing of files.		4
7. Switching from structured programming to POO.		4

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 19992007
3 M. Curilă, **S. Curilă**, "*Programarea în C si C ++* ", Editura Universităţii din Oradea, 2008, 292 pagini, ISBN 978-973-759-554-6
4 R.-D. Albu, M. Curilă, **S. Curilă**, "*Programarea în C ++ Indrumator de laborator*", Editura Universităţii din Oradea, 2009, 150 pagini, ISBN 978-973-759-818-9

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	In order to obtain grade 5, the following conditions must be met: - obtaining at least a grade of 5 in the laboratory test; - knowledge of the basic notions regarding Pointers, C ++ Classes, Instantiation of objects. In order to obtain grades 6, 7, 8 or 9, the students will present two subjects extracted from the package prepared with subjects that contain notions of course. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course. The activity can also be carried out online.	written	80%
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	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2022

Prof.univ. dr. Sorin CURILĂ
e-mail scurila@uoradea.ro,
http://scurila.webhost.uoradea.ro/

Date of endorsement in the department:
19.09.2022

Department Director,
Prof.univ.dr.ing. Daniel TRIP
E-mail: dtrip@uoradea.ro Pagina web:
http://dtrip.webhost.uoradea.ro/

Date of endorsement in the Faculty Board:
23.09.2022

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Documents processing and internet services					
2.2 Holder of the subject		Adrian Șchiop					
2.3 Holder of the academic seminar/laboratory/project		Adrian Șchiop					
2.4 Year of study	1	2.5 Semester	1	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	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	20	3.6 academic seminar/laboratory/project	0/14/0

Distribution of time	hours
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	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	9
Tutorials	2
Examinations	2
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	(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	Room equipped with computers

6. Specific skills acquired	
Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics.
Transversal skills	**CT3.** Adaptation to the new technologies, professional and personal development by means of continuous education formation, using printed documents, specialized software and electronic resources both in Romanian and at least in one international foreign language.

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

7.1 The general objective of the subject	▪ Acquiring the basic principles relating to the applications of network computing systems: html document making, data communication and information access services such as electronic mail, file transfer, remote user connection, www . service
7.2 Specific objectives	▪ The student is able to demonstrate that he has acquired consciousness regarding: the realization of web pages; creating and managing a WEB site;

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Microsoft WORD Create Documents. Templates. Save and share documents. Document formats. General page, font, and paragraph formatting. Columns. Styles.	Interactive lecture, conversation, exposure	1
Computer technology of a complex document. Lists, symbols, footnotes, hyperlinks. Header and footer of a page (header / footer). Tables. Sort data. Picture, Shapes, Wordart, Equation, Chart, Fields.	Interactive lecture, conversation, exposure	1
Microsoft Excel – Part 1 Structure of an Excel workbook and worksheet. Format cells. Enter text, numeric data, formulas. Common mathematical functions (algebraic, statistical, trigonometric, string processing).	Interactive lecture, conversation, exposure	2
Microsoft Excel – Part 2 Chart. Engineering functions. Search and reference functions. Data processing and centralization (sorting, validation, filtering, pivot tables).	Interactive lecture, conversation, exposure	2
Multimedia presentations. Microsoft Powerpoint Create a multimedia presentation. Transfer and insert information (text, pictures, multimedia files). Presentation-specific elements: animations, transitions between slides, action buttons. Slide Master.	Interactive lecture, conversation, exposure	2
Internet, www, html; http	Interactive lecture, conversation, exposure	2

HTML Codes. Fonts; Blocks of text; Images Links; Orderly lists; Unordered Lists Tables; Frames , Forms Styles, JavaScript	Interactive lecture, conversation, exposure	 2 2 2 2 2 2 2 2
Transfer of FTP files. E-mail service	conversation, exposure	2
Bibliography 1. Internet şi intranet A. Şchiop- http://aschiop.webhost.uoradea.ro/teaching.html 2. A. Bacivarov, C. Ciuchi, G. Petrică, "Servicii Internet", Editura Matrix Rom, Bucureşti, 2011. 3. N. Snell, B. Temple, M. T. Clark, "Internet şi Web. Ghid complet", Editura All, Bucureşti, 2004. 4. I. Roşca, N. Ţăpuş Internet şi intranet- Concepte şi aplicaţii, Editura Economică, Bucureşti 2000. 5. http://www.htmlcodetutorial.com 6. http://www.w3schools.com		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Text processing. Spreadsheet.	conversation, exposure	2
The structure of a WEB page. Insert pictures	conversation, exposure	2
Frames. Links.	conversation, exposure	2
Anchors. Lists	conversation, exposure	2
Tables. Forms	conversation, exposure	2
Special characters in HTML. Introduction to Javascript and CSS (Cascading Style Sheets).	conversation, exposure	2
Presentation of the created WEB page. Lab recovery.	conversation, exposure	2
Bibliography 1. Internet şi intranet A. Şchiop- http://aschiop.webhost.uoradea.ro/teaching.html 2. http://www.htmlcodetutorial.com 3. http://www.w3schools.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

- Acquired skills will be required for employees working in the field of web page development

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	During the semester students will receive two written checks in which they will have to present the codes needed to make a WEB page Minimum required conditions for passing the exam (mark 5): 50% of written codes are correct	Written exam	70%

	For 10: all written codes are correct		
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	ability to operate with assimilated knowledge	A percentage of 5 % of the final note from the laboratory is granted for the successful completion of the individual study theme. Presentation of created web pages	30%
10.7 Project			
10.8 Minimum performance standard: Making a web page that contains different types of fonts; blocks of text, images, links; orderly lists; unordered lists.			

Completion date:
20.09.2020

Date of endorsement in the department:
28.09.2020

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 The Faculty	Electrical Engineering and Information Technology
1.3 Department	Electronics and Telecommunications
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of studies	**Undergraduate studies (Cycle I)**
1.6 Education / Qualification Program	ELECTRONIC APPLIED / Engineer

2. Data related to the subject

2.1 Name of the discipline			**ELECTRONIC DEVICES**				
2.2 Course holder			Lect. PhD. Eng. BURCA ADRIAN				
2.3 The owner of the laboratory activities			Lect. 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	I

(I) Impusă; (O) Opţională; (F) Facultativă

3. Estimated total time (hours per semester of teaching activities)

3.1 Number of hours per week	1	of which: 3.2 course	2	3.3 academic laboratory	1
3.4 Total of hours from the curriculum	14	Of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time					83 fours
Study using the manual, course support, bibliography and handwritten notes					24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					23
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					27
Tutorials					-
Examinations					9
Other activities.					-

3.7 Total of hours for individual study	**83**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Precondiţii (acolo unde este cazul)

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
5.2.for the development of the academic seminary/laboratory/project	The laboratory can take place face to face or online. The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students the laboratory guide in printed or electronic format.

6. Specific skills acquired

Professional skills	**C1. Using the fundamentals of devices, circuits, systems, instrumentation and electronic technology:** - Analysis of electronic circuits and systems of low/medium complexity, in order to design and measure them. - Diagnostics/troubleshooting of electronic circuits, equipment and systems. - The design and implementation of electronic circuits of small/medium complexity using the standards in the field. **C2. Application of basic methods for signal acquisition and processing:** - The use of specific methods and tools for the analysis of electronic circuits. - The design of basic electronic functional blocks with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques**: - Solving concrete practical problems that include hardware elements. - Realization of projects involving hardware and software components.
Trans versal 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 mission of the Electronic Devices discipline in the Applied Electronics specialization is to ensure the training of competitive specialists in the field of applied electronics and telecommunications, as well as the acquisition by students of knowledge related to the constructive types of electronic devices, subassemblies and components. The rational and optimal design of the form, dimensions and quality, but also the overall functioning of electronic devices and circuits.
7.2 Specific objectives	The course is fundamental for the student's preparation, therefore it combines the two important aspects, formative and informative. Emphasis is placed on the study of electronic devices and the analysis of electronic circuits. The aim is to acquire the necessary skills and experiment with concrete schemes.

8. Contents*

8.1. Course	teaching methods	No. Hours / Observations
1. Notions of semiconductor physics	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
2. The p-n junction. Characteristics	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
3. Single-phase rectifiers	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
4. The bipolar transistor (I)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
5. The bipolar transistor (II)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
6. Polarization of bipolar transistors	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
7. Unipolar transistors (I). JFET's.	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
8. Unipolar transistors (II) MOSFETs	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
9. Polarization of unipolar transistors	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
10. Enlargement schemes with small signal transistors (I)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
11. Transistor, low signal (II) amplification schemes	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
12. Multi-junction devices (I) Thyristor, Triac	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
13. Multi-junction devices (II) IGBT transistor	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
14. Electric noise in amplifiers	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2

Bibliography:
[1] D.Dascalu, M.Profirescu, A.Rusu; Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982
[2] D.Scurtu, C.Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Universitatii din Oradea, 2004
[3] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Universităţii din Oradea, 2010
[4] A.Burca, C.Gordan: Dispozitive electronice, Curs format electronic, 2015

8.2 Seminar	Teaching methods	No. Hours / Observations
8.3 Laboratory	Teaching methods	No. Hours / Observations
L1. Semiconductor diode	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L2. Zener diode	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L3. Bipolar transistron in steady state	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L4. Polarization of the transistor	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L5. Field effect transistors	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L6. Thyristor, triac.	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L7. Final verification.	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
8.4 Project		

8.5 Bibliography:

[1] D.Dascalu, M.Profirescu, A.Rusu: Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982
[2] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Univer. din Oradea, 2010
[3] D.Scurtu, C. Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Univ. din Oradea, 2004
[4] S.Castrase, A.Burca, C.Gordan: *Dispozitive şi circuite electronice*, Îndrumător de lucrări de laborator, ISBN 978-606-10-1610-5, Editura Universităţii din Oradea 2015

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

- The content of the Electronic Devices discipline is in accordance with those taught in other universities in the country, respectively abroad. The meetings of university teaching staff with representatives of professional associations and employers led to the adaptation of the analytical program to the specific requirements of the labor market. Also, the content of the discipline's analytical program was debated numerous times at the annual meetings of the participants in the Scientific Communication Sessions and with the ARACIS members in various stages of the conducted controls.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1. Each theory topic developed (minimum grade 5) 2. Coherence in expression and the correct use of specialized terminology	Written/oral/online, 3 hours, applications	70%
10.6 Laboratory	1. Participation in all hours of practical activities 2. Knowledge of methods for solving practical applications 3. Solving specific calculations and completing the centralizing tables of results	Written/oral/online A percentage of 30% of the final grade from the laboratory is awarded for the successful completion of the individual study topic.	30%
10.8 Minimum performance standard: knowledge regarding the basic concepts related to electrical circuits and Kirchoff's theorems;			

knowledge regarding the basic concepts related to the pn junction; knowledge regarding bipolar transistors; knowledge about unipolar transistors (JFET and MOS); knowledge regarding the basic concepts related to polarization circuits.

Signature of the course holder
Lect. dr. eng. Burca Adrian

Signature of the laboratory holder
Lect. dr. eng. Burca Adrian

Completion date:
5.09.2022

Contacts:
University of Oradea, Faculty of I.E.T.I.
Str. University, no. 1, Building Corp B, floor 2, room B 224
Postal code 410087, Oradea, Bihor county, Romania
Tel .: 0259-408194, E-mail: aburca@uoradea.ro

Date of endorsement in the department:

19.09.2022

Signature of the department director
Prof. dr. eng.Nistor Daniel Trip
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
23.09.2022

Signature of the Dean
Prof. dr. eng.habil. IoanMirceaGordan
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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Electronic Technology					
2.2 Holder of the subject		Moldovan Liviu					
2.3 Holder of the academic seminar/laboratory/project		Moldovan Liviu					
2.4 Year of study	I	2.5 Semester	2	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	0/1/0
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					21
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					7
Examinations					5
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	(Conditions) -
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	projector
5.2.for the development of the academic	The students will have access to the didactic materials necessary for the development in optimal conditions of the works provided in the syllabus.

seminary/laboratory/project	

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** C1.1 Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. C1.3 Troubleshooting and repairing certain electronic circuits, equipment and systems. C1.4 Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. C2. Using basic knowledge to explain and interpret various types of concepts, situations, processes, projects, etc. associated with the domain
Transversal skills	**CT3.** Adaptation to the new technologies, professional and personal development by means of continuous education formation, using printed documents, specialized software and electronic resources both in Romanian and at least in one international foreign language.

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

7.1 The general objective of the subject	▪ The study of the performances of the basic technologies in the realization of the main components used in the current electronics
7.2 Specific objectives	▪ To know the fundamental constructive conception of electronic equipment, technologies for making resistors, capacitors, coils, semiconductor diodes, subassemblies, as well as SMD type electronic components. ▪ Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions ▪ Troubleshooting and repairing certain electronic circuits, equipment and systems. ▪ Using basic knowledge to explain and interpret various types of concepts, situations, processes, projects, etc. associated with the domain

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Current trends in electronic technology. Technical issues of electronic engineering, technical economic study, marketing study, design them, electronic design	Transmission of knowledge using oral communication, presentation, conversation, problematization (using video and power point materials), written communication (bibliographies).	2
2. The technology for making resistors. Wound resistor technology, film resistor technology. Resistor microminiature technologies. Reliability of resistors.		2
3. Capacitor design technology.Fixed, variable, adjustable, special capacitors. Reliability of capacitors		2
4. Coil making technology. Conductive coil construction and technology for winding, coil housing. Types of windings, winding impregnation, core types, cores characteristics		2
5. Passive electronic component manufacturing technology of the SMD type.		2
6. . Lithography and engraving techniques. Lithography. Photolithography technology. Engraving		2
7. Semiconductor diode technology. Behavior of the p-n junction, classification of semiconductor diodes. Dotted diodes. Diodes broadcast. Flat epitaxial diodes. Diode Schotty.		2
8. Discrete transistor technology. Bipolar transistor technology. Field effect transistor technology		2
9. Embedded circuit technology		2
10. Technology of active electronic components of SMD type		2
11. M Harness technology in electronics. Linking technology by soldering. Technology of printed circuits.		2

12. Technology of SMD components printed circuits. Making unprotected wiring harnesses		2
13. Technology for tinning electronic components through THT holes		2
14. Connect the electronic components. Conductive adhesives. Technologies for depositing conductive adhesives.		2
Bibliography 1. Electronic technology, cours, Nicolae Draghiciu,ed. Imprimeriei de Vest Oradea 2009 2. Trends in electronic technology, Nicolae Draghiciu Dan Scurtu, ed. Imprimeriei de Vest Oradea 2009 3. Electronic Components and Technology, Stephen Sangwine, CRC Press, 2007 4. Electronics Technology Fundamentals, Robert T. Paynter, B. J. Toby Boydell, Pearson/Prentice Hall, 2007		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Technology and characteristics of coiled resistors.	Method based on direct and indirect action and simulated action,	2
2. Technology and characteristics of fixed resistors with carbon or nickel film		2
3. Potentiometer technology		2
4. Technology and characteristics of single-layer ceramic capacitors		2
5. Technology and characteristics of semi-variable ceramic capacitors		2
6. Semiconductor diodes, semiconductor diode technology		2
7. Design and technology of print wiring		2
Bibliography 1. Electronic technology, Practical works. Vol I şi Vol II. ,Virgil Maier, Mircea Chindriş, Rodica Creţ, Editura Institutului Politehnic Cluj Napoca, 1990. 2. Electronic technology, Laboratory works works, Draghiciu Nicolae , Editura Universitatii din Oradea ,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

- Introduction in the course of the course of the alternative technologies for connecting the SMD type electronic components used in the industrial environment of Oradea.

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 - knowledge of the technology of making a resistor - knowledge of the technology of making a capacitor. - For 10: Correct and reasoned answer to the evaluation requirements	Written Synthesis topics that include specific objectives	70%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard A practical work done	Active participation in laboratory work	30%

	during the semester and presentation of results. - For 10: Active participation in all laboratory activities		
10.7 Project			
10.8 Minimum performance standard: Course: Knowing and understanding the basic notions presented in the course. knowledge of SMD technology of a resistor, capacitor Laboratory: Knowledge and use of laboratory equipment			

Completion date: 16.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Electronical Engineering, Telecomunications and Information Technologies
1.4 Field of study	Engineering Sciences
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject		Fundamentals of Electrical Engineering I					
2.2 Holder of the subject		Lecturer phd.eng. **ARION MIRCEA NICOLAE**					
2.3 Holder of the academic seminar/laboratory/project		Lecturer phd.eng. **ARION MIRCEA NICOLAE** Lecturer phd.eng. **ARION MIRCEA NICOLAE**					
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					
Study using the manual, course support, bibliography and handwritten notes					**5**
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					**5**
Tutorials					**3**
Examinations					**3**
Other activities.					
3.7 Total of hours for individual study	**19**				
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	The course is presented 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 will be held face to face 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 basic elements related to electronic devices, circuits and instrumentation and electronic. C2. Application of basic methods for signal acquisition and processing, in special situations. C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microcontrollers, languages and programming techniques.
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 " Fundamentals of Electrical Engineering 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 " Fundamentals of Electrical Engineering I " presents basic theoretical notions of the macroscopic theory of electromagnetism, for understanding the technical applications of this theory. Elements of the theory of electric circuits are also presented in the course: the regime-based approach to electric circuits (linear electric circuits in stationary mode, non-linear direct current circuits, in permanent sinusoidal mode) as well as the specific methods of analysis of the presented electric circuits. ▪ The objectives of the discipline are the knowledge and understanding of the basic fundamental relationships regarding the macroscopic theory of electromagnetism, of electric circuits in steady-state non-linear direct current, in permanent sinusoidal regime, explaining and interpreting the behavior of electric circuits, performing calculations and determinations in electric circuits, experimental verification of the basic relationships for physical systems encountered in industrial practice, the simulation of 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. 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. The law of electric flux The law of connection between D, E and p. Law of conservation of free electric charge	Video projector, slides and whiteboard. Interactive teaching	2
The law of electrical conduction The law of transformation of electromag energy. by conducting electric currents 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
CHAPTER 2. 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 3. 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 4. 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 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

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:
29.08.2022

Date of endorsement in the department:
22.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Electronical Engineering, Telecomunications and Information Technologies
1.4 Field of study	Engineering Sciences
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject		Fundamentals of Electrical Engineering II					
2.2 Holder of the subject		Lecturer phd.eng. **ARION MIRCEA NICOLAE**					
2.3 Holder of the academic seminar/laboratory/project		Lecturer phd.eng. **ARION MIRCEA NICOLAE**					
2.4 Year of study	2	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	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					
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					**6**
Tutorials					**4**
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	The course will be presented 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 will be held face to face 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 basic elements related to electronic devices, circuits and instrumentation and electronic. C2. Application of basic methods for signal acquisition and processing, in special situations. C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microcontrollers, languages and programming techniques.
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 " Fundamentals of Electrical Engineering 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 " Fundamentals of Electrical Engineering II " presents elements of the theory of electric circuits: the approach by regimes of electric circuits (three-phase electric circuits, linear electric circuits in periodic non-sinusoidal regime, linear electric circuits in transient regime) as well as the specific methods of analysis of the presented electric circuits. Finally, fundamental notions regarding the quadrupole theory are presented. ▪ 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 4. 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 5. 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 6. 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 7. 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 8. ELEMENTS OF QUADRIPOLE THEORY Definitions. classification The equations of the diport quadripole The transition from one system of quadripole equations to another Interconnection of quadrupoles	Video projector, slides and whiteboard. Interactive teaching	2
Equivalent schemes of the quadrupole Testing of the quadripole The characteristic impedance and propagation constant of the symmetrical quadripole	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
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
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	2

	devices, the work with the same title is completed	
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:
28.08.2022

Date of endorsement in the department:
22.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Passive components and circuits**				
2.2 Holder of the subject			Associate Prof.PhD.Castrase Simona Cristina				
2.3 Holder of the academic seminar			Associate Prof.PhD.Castrase Simona Cristina				
2.4 Year of study	I	2.5 Semester	1	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 seminar	**1**
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar	**14**
Distribution of time:					58
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					8
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	(Conditions)
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 seminary	Moodle platform- online
6. Specific skills acquired	
Professional skills	C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology C2. Applying basic methods for the acquisition and processing of signals
Transversal skills	CT1. The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks.

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

7.1 The general objective of the subject	Development of scientific engineering thinking, familiarization of the future specialist with the types of electrical signals as well as with the symbols used in the description of passive electronic circuits. Understanding the operating principles of passive devices and circuits, as well as methods for measuring electrical quantities.
7.2 Specific objectives	The student will know the passive electronic devices. He will master the phenomena underlying passive devices, will know the internal structure and operation of various passive electronic devices, the significance of passive components parameters, the use in applications of the catalog parameters of passive components, knowledge of the characteristics of passive components technologies, determination or by measurement) of the properties of electronic components, analysis and design of simple circuits with passive components, knowledge of the characteristics of the main technologies for the realization of interconnection structures. The activity at the seminar is focused on applications specific to the chapters taught in the course and aims to form calculation skills.

8. Contents*

8.1 Course	Teaching methods	No. hours
Electrostatics. Electric load. Electric field. Electric force. The interaction force between electrical charges. Electric potential and electric voltage.		2

Electric flow. Gauss's law. Applications to the calculation of the electrostatic field and potential	Direct teaching aided by visual methods of presentation on site	2
Electrokinetic state. Electric current. Electric motor voltage. Electrical conduction. The law of electrical conduction. Ohm's law.		2
Joule-Lenz Law. Electricity conservation law. Kirchoff's theorems. Circuits with resistors connected in series and in parallel		2
Electromagnetism. Magnetic field. Magnetic induction. Magnetic field strength. Magnetic field forces Magnetic field sources. Conductors traversed by electric currents. Magnetic flux and voltage		2
Passive circuit component. General properties.. Electrical resistance. Parameters.		2
Fixed resistors. Variable resistors. Connecting resistors Fixed resistor applications.		2
Electric capacitor .Definitions. Classification. Symbols. Parameters. Electrical capacity of electric capacitors. Equivalent capacity of fixed capacitors.		3
Coils. Effects associated with the induction phenomenon. Inductance. Variable currents in coils. The law of induction. Energy and forces of the magnetic field.		3
Analysis of the dynamic regime in passive circuits. RL circuits. RC circuits. DC RLC circuits, applications.		2
Alternating sinusoidal circuits. Alternative sinusoidal quantities. Methods for solving circuits in sinusoidal regime.		2
Ideal circuit elements in a.circuits with resistors, coils and capacitors in a.c.		4
Bibliography S. Castrase, Componente si circuite pasive, ISBN 978-606-10- 1451-4, Ed. Universitatii Oradea, 2014. Pitică Dan, Radu Mihaela, Componente electronice pasive, Litografia UTC-N, 1994 Svasta Paul, Componente şi circuite pasive – Condensatoare, Editura UPB,1997 Svasta Paul, Componente şi circuite pasive – Rezistoare, Editura UPB,2000		
8.2 Academic seminar	Teaching methods	No. hours
Electrostatic problems	application problems	2
Use of basic theorems in circuit analysis		2
Electrokinetic problems		4
Electromagnetism problems		2
Continuous circuits with passive components		2
Alternativ curent circuits with passive components (RL, RC, RLC)		2
Bibliography S. Castrase, *Componente şi circuite pasive*, Culegere probleme, ISBN 978-606-10-1451-4, Ed. Univ.Oradea, 2018. T. Svasta P., *Componente si circuite pasive,* culegere de probleme, Ed Cavallioti, 2012 C-tin Cioaca, C. Stanescu, M Fifirig: *Probleme rezolvate de electricitate*, Editura Facla,1997; Petrica Criste, *Probleme de Electricitate*, Universitatea Bucuresti, 2012 Ioan Fetita , Electrocinetica (I) - *Teorie si probleme,* Ed.Universitaria, 1994		

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 can be found in the curriculum of the Applied Electronics specialization and from other university centers that have accredited these specializations.

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 for grade 5: knowledge of the notions of electrical signals, laws and theorems on passive devices and circuits, knowledge of how to represent and operate passive devices 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 passive devices, the ability to explain the operation of circuits with passive components in d.c. The seminar activity is concluded and marked with grade 10.	Written paper / online test evaluation	70%
10.5 Academic seminar	for Note 5: Knowledge of the resolution, representation and operation of passive electronic devices for grade 10: knowledge of solving problems regarding the analysis of circuits with passive components in dc and dc mode, mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. 15% of the grade from the seminar is the evaluation of the individual topics received weekly for solving.	Individual themes + online test evaluation	30%
10.6 Laboratory	-		
10.7 Project	-		
10.8 Minimum performance standard: Knowledge of solving, how to represent and operate passive electronic devices.			

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics **/** Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Analog integrated circuits**						
2.2 Holder of the subject	**Lect.dr.eng. Gavriluţ Ioan**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.dr.eng. Gavriluţ Ioan**						
2.4 Year of study	II	2.5 Semester	3	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 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	44
Study using the manual, course support, bibliography and handwritten notes	19
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	13
Tutorials	3
Examinations	3
Other activities.	0

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	The classroom. The course can be held face to face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. **C2. Applying basic methods for the acquisition and processing of signals:** - Using specific methods and instruments for signal analysis. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods.
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 addresses the issue of structure, operation and applications with analog circuits. The domain is presented gradually, from the description of the main parameters to complex applications using analog integrated circuits. The objective is to ensure the theoretical and practical support necessary for the use of analog integrated circuits and the subsequent study of related disciplines.
7.2 Specific objectives	- description of the circuits that compose the analog integrated circuits - description of the operation of the operational amplifier - basic AO configurations (integrators, branch circuits, precision rectifiers, comparators, etc.)

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
C1. Introduction. Parameters and characteristics of analog integrated circuits	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	2
C2. Current sources. Voltage sources		2
C3. The ideal operational amplifier (AO)		2
C4. Basic configurations with AO		2
C5. Parameters of operational amplifiers		2
C6. Internal structure of AO. Static errors		2
C7. Dynamic behavior of AO		2
C8. Differential amplification amplifiers		2
C9. Output stages (final)		2
C10. Summing Amplifier		2
C11. Integration circuits		2
C12. Derivation circuits		2
C13. Precision rectifiers		2
C14. Voltage comparators		2

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A. Manolescu, A. Manolescu, I. Mihuţ, T. Mureşan, L. Turic - *Circuite integrate liniare* - Ed. Did. şi Pedagogică, Buc. 1983		
I. Gavriluț, *Circuite integrate analogice - curs pentru uzul studenților*, Universitatea din Oradea, 2015.		
Paul R. Gray, Robert G. Meyer – C*ircuite integrate analogice - Analiză şi proiectare* - Ed. Teh., Buc. 1998		
A. Manolescu, A Manolescu - *Circuite integrate liniare (Culegere de probleme)* - Ed. Şt. şi Enc. Buc. 1987		
Lar Călin - *Circuite analogice - Îndrumător de laborator* - Ed. Univ. Oradea 2003		
M. Ciugudean, V. Tiponuţ, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicaţii*, Ed. Facla Timişoara, 1986.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of laboratory works and labor protection	Using the laboratory guide, presenting the paper, performing the measurements, performing the related calculations, completing the tables of results and making graphs The activity can also be carried out online	2
L1. Current sources		2
L2. Voltage sources		2
L3. Non-inverting amplifier with AO		2
L4. Inverting amplifier with AO		2
L5. Differential circuit with AO		2
L6. Frequency characteristic of AO		2
L7. Output stages		2
L8. Summing amplifier		2
L9. Integration and derivation circuits		2
L10. Precision rectifiers		2
L11. Comparators. Applications		2
L12. Applications with E555		2
Recoveries and final verification		2
Bibliography		
A. Manolescu, A Manolescu - *Circuite integrate liniare (Culegere de probleme)* - Ed. Şt. şi Enc. Buc. 1987		
I. Gavriluț, L. Țepelea, A. Gacsadi, *Circuite integrate analogice - Îndr. de lab.*, Ed. Univ. din Oradea, 2018.		
M. Ciugudean, V. Tiponuţ, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicaţii*, Ed. Facla Timişoara, 1986.		
Paul R. Gray, Robert G. Meyer – *Circuite integrate analogice - Analiză şi proiectare* - Ed. Teh., Buc. 1998		
Lar Călin - *Circuite analogice - Îndrumător de laborator* - 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 is in accordance with those taught at other universities in the country and abroad. The meetings of the university teachers with representatives of the professional associations and of the employers led to the adaptation of the analytical program to the specific requirements of the labor market. Also, the content of the analytical program of the discipline was debated with ARACIS members in various stages of the controls carried out.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The level and quality of student training in the course.	written test or quizzes in the case of online assessment	80%
10.5 Academic seminar			
10.6 Laboratory	Assimilation of theoretical and practical knowledge following individual study and laboratory work.	Verification of the accumulation of knowledge and the ability to use practical applications.	20%

10.7 Project			
10.8 Minimum performance standard: Course: knowledge of the basics of current and voltage sources used in analog integrated circuits; knowledge of the basics about basic amplifiers with operational amplifiers Laboratory: carrying out the practical assembly			

Completion date:

15.09.2020

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Date of endorsement in the department:

18.09.2020

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Date of endorsement in the Faculty Board:

23.09.2020

Dean,
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Pagina web: http://mgordan.webhost.uoradea.ro/

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Computer aided graphics**						
2.2 Holder of the subject	Prof.dr.ing. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Conf.dr.ing. Ioan Buciu						
2.4 Year of study	II	2.5 Semester	3	2.6 Type of 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 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 (in hours)					44
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
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	Computer programming and programming languages
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the process of the course	equipped with video projector or Teams application.
5.2. for the process of the seminary/laboratory/project	computer equipment, Matlab or Octave software Teams application. The laboratory can be carried out face-to-face or online.

6. Specific skills acquired

Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** • Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers • Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. • Carrying out projects that involve hardware components (processors and software components (programming).
Transversal skills	**CT1.** The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks. **CT2.** Defining activities on stages and their distribution to subordinates, with the complete explanation of duties, depending on the hierarchy levels, thus 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	▪ The general objective of this discipline is to familiarize students with the specific concepts of computer-assisted graphics in electronics starting from Graphic Systems, Coordinate Systems, Two-Dimensional Graphic Transformations, Projections, Visualization Transformations and Reflection and Lighting Models.
7.2 Specific objectives	• The specific objectives of this discipline are to develop students 'knowledge of Graphic Systems and Coordinate Systems used in computer-aided graphics in electronics as well as to develop students' skills to implement algorithms in the field of two-dimensional graphical transformations, projections, visualization transformations. and Reflection and Lighting Models.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. **Graphic systems** Classification Display devices Input devices Graphic systems architectures	Lecture + interactive methods	4
2. **Coordinate systems**		2
3. **Two-dimensional graphic transformations** Translation, Scaling, Rotation Composition of transformations Inverse geometric transformations Transformations of the coordinate system Shearing		8
4. **Projections** Parallel projections Perspective projections		4
5. **Cutting algorithms** Cutting points Cutting the lines The Cohen-Sutherland algorithm		4
6. **Visualization transformations** 2D visual transformations 3D visualization transformations		4
7. **Textures. Generalities. Texture generation**		2

Bibliography:

1. Moldoveanu ş.a. - Grafică electronică pe calculator - Editura Teora, Bucureşti, 1996
2. M. Ghinea, V. Zamfir - MATLAB. Calcul numeric. Grafică. Aplicaţii - Editura Teora, Bucureşti, 2003
3. M. Pater – Elemente de grafică pe calculator – Editura Universităţii din Oradea, ISBN 973-613-203-X, 2002
4. Badler N.I et al. – Simulating Humans: Computer Graphics, Animation and Control, 283 pag., 1999
5. Grigore-Adrian Iordăchescu, Monica-Anca Chita - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura MatrixRom, Bucureşti, 2015
6. Grava C. – Grafică electronică pe calculator - disponibilă pe pagina web http://cgrava.webhost.uoradea.ro/documentatie_Grafica.html
7. Adrian Runceanu - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura Academică Brâncuşi, 2009
8. George Mahalu – Introducere în grafica asistată de calculator, ISBN 978-606-25-0188-4, Editura MatrixRom, Bucureşti, 2015
9. F.M. Enescu, C. Hoarca - Grafică asistată de calculator, ISBN 978-606-25-0388-8, 2018
10. S. Marschner, P. Shirley – Fundamentals of Computer Graphics, ISBN 9780367505035, CRC Press, 2021

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Getting started. Presentation of works	Practical works for simulation and development of	28
2. Introduction to MATLAB: Commands, Functions, Numerical Calculation, Graphics in MATLAB		2

3. 2D graphic transformations	application programs, debates on the problems encountered and methods for solving them	6
4. Algorithms for generating geometric shapes		4
5. Cutting algorithms		4
6. Generation of curves, surfaces and textures		4
7. Recovery of laboratory works		4

Bibliography

1. M. Ghinea, V. Zamfir - MATLAB. Calcul numeric. Grafică. Aplicaţii - Editura Teora, Bucureşti, 2003
2. Grigore-Adrian Iordăchescu, Monica-Anca Chita - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura MatrixRom, Bucureşti, 2015
3. Grava C. – Grafică electronică pe calculator - disponibilă pe pagina web http://cgrava.webhost.uoradea.ro/documentatie_Grafica.html
4. Adrian Runceanu - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura Academică Brâncuşi, 2009
5. S. Marschner, P. Shirley – Fundamentals of Computer Graphics, ISBN 9780367505035, CRC Press, 2021

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 some potential main employers of the students of this specialization. Together with disciplines such as "Shape Recognition" or "Image Processing and Analysis" it responds to practical applications that can be applied in the production process of most electronic component manufacturers in the industrial park of Oradea.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Exam result and activity during the semester	The result of the exam and the written exam (and oral, if applicable). The assessment can be done face to face or online. Activity during the semester	70%
10.5 Academic seminar	-		
10.6 Laboratory	the result of the final evaluation and the activity during the semester	Evaluation - designing a practical application. The evaluation can be done face to face or online.	30% A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic and for the activity during the semester.
10.7 Project			
10.8 Minimum performance standard: dealing with at least one subject of theory, that of applications and the correct answer to 2 eliminatory questions in the exam, respectively the design and implementation of an elementary algorithm of Computer Aided Graphics, in the laboratory.			

Completion date:
15.09.2022

Signature of the course holder

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Signature of the laboratory holder

conf.dr.ing. Ioan Buciu
ibuciu@uoradea.ro
https://prof.uoradea.ro/ibuciu/

Date of endorsement in the department:
19.09.2022

Signature Departament Directory

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Date of endorsement in the Faculty Board:
23.09.2022

Dean's Signature

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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 Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Computer aided graphics- project**					
2.2 Holder of the subject							
2.3 Holder of the academic seminar/laboratory/project		Prof.dr.ing. Cristian Grava					
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	2	of which: 3.2 course	-	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	-	3.6 academic seminar/laboratory/project	28

Distribution of time (in hours)	22
Study using the manual, course support, bibliography and handwritten notes	6
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	2
Other activities.	-

3.7 Total of hours for individual study	**22**
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	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the course	(Conditions)
5.2.for the process of the seminary/laboratory/project	computer equipment, Matlab or Octave software Teams application. The laboratory can be carried out face-to-face or online.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** • Explaining and interpreting methods for the acquisition and processing of signals. • Using simulation environments for the analysis and processing of signals. • Using specific methods and instruments for signal analysis. • Designing elementary functional blocks for the digital processing of signals with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** • Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers • Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. Carrying out projects that involve hardware components (processors and software components (programming).

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

7.1 The general objective of the subject	▪ The general objective of this discipline is to familiarize students with the specific problems of developing an application in the field of computer aided graphics.
7.2 Specific objectives	• The specific objectives of this discipline consist in the development of knowledge and skills of students to implement visualization algorithms, cutting points and lines, geometric transformations, projections and textures.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
8.2 Academic seminar/laboratory/project		
8.4 Project		
1. Translation, Scaling, Rotation	Designing an imposed / chosen application. Theoretical and software development	4
2. Composition of transformations, Inverse geometric transformations		4
3. Parallel projections		4
4. Perspective projections		4
5. Cutting points		4
6. Cutting the lines		4
7. 2D visualization transformations		4

Bibliography

1. M. Ghinea, V. Zamfir - MATLAB. Calcul numeric. Grafică. Aplicaţii - Editura Teora, Bucureşti, 2003
2. Grigore-Adrian Iordăchescu, Monica-Anca Chita - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura MatrixRom, Bucureşti, 2015
3. Grava C. – Grafică electronică pe calculator - disponibilă pe pagina web http://cgrava.webhost.uoradea.ro/documentatie_Grafica.html
4. Adrian Runceanu - Grafică asistată de calculator. Teorie şi aplicaţii, ISBN 978-606-25-0183-9, Editura Academică Brâncuşi, 2009
5. S. Marschner, P. Shirley – Fundamentals of Computer Graphics, ISBN 9780367505035, CRC Press, 2021

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 some potential main employers of the students of this specialization. Together with disciplines such as "Shape Recognition" or "Image Processing and Analysis" it responds to practical applications that can be applied in the production process of most electronic component manufacturers in the industrial park of Oradea.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.7 Project	The result of the final evaluation and the activity during the semester	Evaluation - designing a practical application. The evaluation can be done face to face or online.	100% A percentage of 10% of the final grade from the project is awarded for the practical achievement and the activity during the semester.
10.8 Minimum performance standard: Minimum performance standard, for grade 5: development and implementation of an elementary algorithm in the field of computer aided graphics.			

Completion date:
15.09.2022

Signature of the course holder
prof. Cristian Grava
cgrava@uoradea.ro

Signature of the laboratory holder
prof. Cristian Grava
cgrava@uoradea.ro, https://prof.uoradea.ro/cgrava/

Date of endorsement in the department:
19.09.2022

Signature Departament Directory
prof.dr.ing. Daniel Trip
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Date of endorsement in the Faculty Board:
23.09.2022

Dean's Signature
prof.univ.dr.ing. Ioan – Mircea Gordan
mgordan@uoradea.ro, https://prof.uoradea.ro/mgordan/

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	UNIVERSITY OF ORADEA
1.2 The Faculty	Electrical Engineering and Information Technology
1.3 Department	Electronics and Telecommunications
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of studies	**Undergraduate studies (Cycle I)**
1.6 Education / Qualification Program	ELECTRONIC APPLIED / Engineer

2. Data related to the subject

2.1 Name of the discipline			**FUNDAMENTAL ELECTRONIC CIRCUITS**				
2.2 Course holder			Lect. PhD. Eng. BURCA ADRIAN				
2.3 The owner of the laboratory activities			Lect. PhD. Eng. BURCA ADRIAN				
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

(I) Impusă; (O) Opţională; (F) Facultativă

3. Estimated total time (hours per semester of teaching activities)

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

Distribution of time	44 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	11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	-
Examinations	9
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. Precondiţii (acolo unde este cazul)

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
5.2.for the development of the academic seminary/laboratory/project	The laboratory can take place face to face or online. The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students the laboratory guide in printed or electronic format.

6. Specific skills acquired

Professional skills	**C1. Using the fundamentals of devices, circuits, systems, instrumentation and electronic technology:** - Analysis of electronic circuits and systems of low/medium complexity, in order to design and measure them. - Diagnostics/troubleshooting of electronic circuits, equipment and systems. - The design and implementation of electronic circuits of small/medium complexity using the standards in the field. **C2. Application of basic methods for signal acquisition and processing:** - The use of specific methods and tools for the analysis of electronic circuits. - The design of basic electronic functional blocks with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques**: - Solving concrete practical problems that include hardware elements. - Realization of projects involving hardware and software components.
Trans versal 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 mission of the Fundamental Electronic Circuits discipline in the Bachelor of Applied Electronics study program is to ensure the training of competitive specialists in the field of applied electronics and telecommunications regarding the students' acquisition of knowledge related to the constructive types of electronic devices, subassemblies and fundamental electronic circuits . • The design and implementation of electronic circuits of small/medium complexity using technologies and the standards in the field
7.2 Specific objectives	The course is fundamental for the student's preparation, therefore it combines the two important aspects, formative and informative. The course focuses on the study, analysis and design of elementary electronic circuits. The aim is to acquire the necessary skills, as well as to experiment with concrete fundamental schemes.

8. Contents*

8.1 Course	teaching methods	No. Hours / Observations
1. Amplifiers. Enhancing Circuits with Transistors (I)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
2. Amplifiers. Enhancing circuits with transistors (II)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
3. Operational Amplifiers. Applications (I)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
4. Operational Amplifiers. Applications (II)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
5. Reactive Amplifiers	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
6. Harmonic oscillators	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
7. RC oscillators	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
8. LC oscillators	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
9. Modulation, Demodulation	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
10. Voltage and current stabilizers (I)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
11. Voltage and current stabilizers (II)	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
12. Protection of stabilizers	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
13. Switching circuits with discrete elements. Bistable	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2

14. Switching circuits with discrete elements. Monostable	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2

Bibliography:
[1] D.Dascalu, M.Profirescu, A.Rusu; Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982
[2] D.Scurtu, C.Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Universitatii din Oradea, 2004
[3] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Universităţii din Oradea, 2010
[4] A.Burca, C.Gordan: Dispozitive electronice, Curs format electronic, 2015

8.2 Seminar	Teaching methods	No. Hours / Observations
8.3 **Laboratory**	Teaching methods	No. Hours / Observations
L1. Repeater on emitter	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L2. Amplifier with transistor in EC connection	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L3. Amplifier with transistor in BC connection	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L4. Amplifier in DC connection with JFET	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L5. Voltage stabilizers I (with discrete components)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L6. Voltage stabilizers II (with specialized integrated circuits)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L7. Protection for voltage and current stabilizers	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L8. Operational Amplifiers. Applications (I)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L9. Operational Amplifiers. Applications (II)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L10. RC oscillators	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L11. LC oscillators	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L12. Switching circuits, bistable	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L13. Switching circuits, astable, monostable	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L14. Final check.	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
8.4 Project		

8.5 Bibliography:

[1] D.Dascalu, M.Profirescu, A.Rusu: Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982
[2] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Univer. din Oradea, 2010
[3] D.Scurtu, C. Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Univ. din Oradea, 2004
[4] S.Castrase, A.Burca, C.Gordan: *Dispozitive şi circuite electronice*, Îndrumător de lucrări de laborator, ISBN 978-606-10-1610-5, Editura Universităţii din Oradea 2015

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

- The content of the Fundamental Electronic Circuits discipline is in accordance with those taught in other universities in the country, respectively abroad. The meetings of university teaching staff with representatives of professional

associations and employers led to the adaptation of the discipline sheet to the specific requirements of the labor market. Also, the content of the discipline sheet has been debated many times at the annual meetings of the participants in scientific communication sessions, conferences and with ARACIS members in various stages of the inspections carried out.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1. Each theory topic developed (minimum grade 5) 2. Coherence in expression and the correct use of specialized terminology	Written/oral/online, 3 hours, applications	70%
10.6 Laboratory	1. Participation in all hours of practical activities 2. Knowledge of methods for solving practical applications 3. Solving specific calculations and completing the centralizing tables of results	Written/oral/online A percentage of 30% of the final grade from the laboratory is awarded for the successful completion of the individual study topic.	30%
10.8 Minimum performance standard: knowledge regarding the basic notions regarding negative feedback in amplifiers; knowledge regarding the basic concepts related to harmonic oscillators; knowledge regarding discrete electronic amplifiers;			

Signature of the course holder
Lect. dr. eng. Burca Adrian

Signature of the laboratory holder
Lect. dr. eng. Burca Adrian

Contacts:
University of Oradea, Faculty of I.E.T.I.
Str. University, no. 1, Building Corp B, floor 2, room B 224
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Tel .: 0259-408194, E-mail: aburca@uoradea.ro

Completion date:
5.09.2022

Date of endorsement in the department:

19.09.2022

Signature of the department director
Prof. dr. eng.Nistor Daniel Trip
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
23.09.2022

Signature of the Dean
Prof. dr. eng.habil. IoanMirceaGordan
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	Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics/ 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 Dănuţ**						
2.4 Year of study	**II**	2.5 Semester	**4**	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	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. C5. Application of basic knowledge, concepts and methods from: power electronics, automated systems, electricity management, electromagnetic compatibility.
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 "Industrial Electrotechnics" proposes a familiarization of students in the field of Applied Electronics 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	6 h

	presentation on-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		
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 course 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: 29.08.2022

Date of endorsement in the department:01.09.2022

Date of endorsement in the Faculty Board:23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronical engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	Information transmission theory						
2.2 Holder of the subject	Lect. PhD. Eng. MORGOŞ FLORIN LUCIAN						
2.3 Holder of the academic seminar/laboratory/project	Lect. PhD. Eng. MORGOŞ FLORIN LUCIAN						
2.4 Year of study	II	2.5 Semester	IV	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	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time					58hours
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					12
Tutorials					-
Examinations					8
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	(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
5.2.for the development of	The laboratory can take place face to face or online. The existence of the

the academic seminary/laboratory/project	apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students the laboratory guide in printed or electronic format.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming. - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. - Carrying out projects that involve hardware components (processors and software components (programming). **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. - The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software.

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 is taught to second year students Applied Electronics. The course addresses notions that will allow future graduates to apply basic signal acquisition methods and use programming language and techniques. This discipline aims to present the basic concept in information theory, information modeling of sources and channels, data compression (algorithms and applications), error detection and correction codes (algorithms, circuit and applications).
7.2 Specific objectives	▪ Design of basic functional blocks for digital signal processing. Carrying out projects involving hardware (processors) and software (programming) components. Developing a positive attitude towards the activities of assimilating new professional knowledge and information, cultivating and promoting a scientific environment focused on values, forming a positive and responsible professional behavior.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction to probability theory. Random experiment, events. Probability of an event. Random variable. Probabilities of a random variable. Conditional probabilities. The notion of statistical independence. Numerical signals as strings of random variables.	Interactive lecture, presentation; video projector presentation	2 hours
Sources of information. The information. Definitions and notations. Units of measurement for information. Mutual information of two events.	Interactive lecture, presentation; video projector presentation	2 hours
Discrete sources of information. Definitions and notations. Classification of discrete sources. Markov sources. Description of Markov sources by state diagrams.	Interactive lecture, presentation; video projector presentation	2 hours
Entropy of the discrete sources of information. The entropy of the memoryless source. Properties of entropy. Binary source entropy. Markov source entropy. Markov source decorrelation	Interactive lecture, presentation; video projector presentation	2 hours
Flow, redundancy, relative redundancy. Conjugated entropy of two sources of information. Mutual information of two sources. Conditional entropy of the source of information. Relationships between entropies (Venn diagrams).	Interactive lecture, presentation; video projector presentation	2 hours
Transmission channels of information. Classification of channels. Discrete channels of information transmission. Discrete channel capacity.	Interactive lecture, presentation; video projector presentation	2 hours
Discrete channel models. Uniform distribution on the input. Uniform distribution to the output. Symmetric channel. Poorly symmetric channel. Example of discrete channels. Symmetric binary channel. Binary channel with errors and cancellations.	Interactive lecture, presentation; video projector presentation	2 hours
Sources of information and continuous channels. The entropy of continuous source of information. The significance of the entropy of a continuous source. Fundamental inequality in the case of continuous distributions. Cases of maximum entropy. Variation of entropy with change of signal representation space.	Interactive lecture, presentation; video projector presentation	2 hours
Continuous channels of information transmission. Mutual information in continuous channels. Properties of mutual information in continuous channels. Capacity of continuous channels.	Interactive lecture, presentation; video projector presentation	2 hours
Source encoding. Classification of source encoding codes. Instant or irreducible codes. Absolutely optimal codes. Optimal codes. Capacity, efficiency and the codes redundancy. Extent of an information source. Shannon's First Theorem.	Interactive lecture, presentation; video projector presentation	2 hours
Entropic encoding algorithms. Shannon-Fano encoding. Huffman encoding. Arithmetic encoding.	Interactive lecture, presentation; video projector presentation	2 hours
Channel coding. Decoding error probability. Encoding by repeating symbols. Shannon's 2nd theorem. Space of the words. Graphic representation of words. Hamming distance. Detectable errors and correctable errors. Specifying the words	Interactive lecture, presentation; video projector presentation	2 hours

with meaning.		
Error detection and correction codes. Group codes. Encoding. Decoding. Relationships between the columns of the control matrix H. Hamming code – one error correcting.	Interactive lecture, presentation; video projector presentation	2 hours
Cyclic codes. Representation of code words as polynomials. Space of the words. Specifying the words with meaning. Encoding. Decoding. Encoding using the polynomial $h(x)$. Encoding using matrix computation.	Interactive lecture, presentation; video projector presentation	2 hours
Bibliography 1. Al. Spătaru, *Teoria Transmisiunii Informaţiei*, Editura Didactică şi Pedagogică, Bucureşti, 1983. 2. A.T. Murgan, *Principiile Teoriei Informaţiei în Ingineria Informaţiei şi a Comunicaţiilor*, Editura Academiei Române, Bucureşti, 1998. 3. Borda Monica Elena *Teoria transmiterii informatiei* Editura DACIA Cluj – Napoca 1999. 4. R. Rădescu, Rodica Stoian, *Teoria Informaţiei şi a Codurilor* - îndrumător de laborator, Ed. Printech, 1998.		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1.Discrete Markov sources	Practical application. Discussions	2 hours
2.Noise channels	Practical application. Discussions	2 hours
3.Discrete symbols receivers	Practical application. Discussions	2 hours
4.Channels with constraints - translation codes.	Practical application. Discussions	2 hours
5.Huffman codes	Practical application. Discussions	2 hours
6.Hamming group codes	Practical application. Discussions	2 hours
7.Laboratory recovery. Final evaluation.	Practical application. Discussions	2 hours
Bibliography 1. Guide laboratory - Department and University library. 2. A.T. Murgan, *Principiile Teoriei Informaţiei în Ingineria Informaţiei şi a Comunicaţiilor*, Editura Academiei Române, Bucureşti, 1998. 3. Borda Monica Elena *Teoria transmiterii informatiei* Editura DACIA Cluj – Napoca 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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Active participation in the developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basic notions regarding the approached topics.	Oral or written assessment. Discussions. Arguments. The evaluation can be done face to face or online	60 %
10.5 Academic seminar			
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the	Written test. Practical test. Discussions. Arguments.	40%

	requirements imposed by the laboratory work. Well-documented arguments. Reading the required bibliography. A percentage of 15% of the final grade at the laboratory is awarded for the successful completion of all the topics provided for individual study.		
10.7 Project			

10.8 Minimum performance standard:

Course: obtaining a grade of 5 in the tests of the course, as an average mean of the marks obtained in this type of activity. Knowledge of the basic notions regarding probability theory, discrete sources of information and their entropy, continuous or discrete channels of information transmission, models for discrete channels, source or channel encoding, error detection and correction codes, respectively cyclic codes.

Laboratory: obtaining a grade of 5 in each laboratory test; participation and fulfillment of all requirements imposed by each laboratory work; minimal knowledge of the characteristics and usefulness of discrete Markov sources, noise channels, discrete symbols receivers, constrained channels, Huffman and Hamming group codes.

Signature of the course holder
Lect. dr. eng. Lucian Morgoş

Signature of the laboratory holder
Lect. dr. eng. Lucian Morgoş

Contacts:
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Str. University, no. 1, Building Corp B, floor 2, room B 215
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Date of endorsement in the Faculty Board:
23.09.2022

Signature of the Dean
Prof. dr. eng.habil. IoanMirceaGordan
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	Electronics and Telecommunications
1.4 Field of study	Electronical Engeneering, Telecommunications and Information Technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Measurements in Electronics and Telecommunications**						
2.2 Holder of the subject	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.3 Holder of the academic seminar/laboratory/project	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.4 Year of study	II	2.5 Semester	3	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 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	hours
Study using the manual, course support, bibliography and handwritten notes	24
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	12
Tutorials	3
Examinations	5
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	Mathematical Analysis, Physics, Electronic devices, Fundamentals of Electrical Engineering
4.2 related to skills	Competences corresponding to the first year of preparation for the license in Applied Electronics

5. Conditions (where applicable)

5.1. for the development of the course	Interactive lectures using multi-media technology. The presence of students at courses is not mandatory, but is registered by the teacher in charge of the course, for the correct evaluation of students at the end of the course.
5.2.for the development of the academic seminary/laboratory/project	Attendance at the laboratory is mandatory. It is necessary to study the laboratory work.

6. Specific skills acquired	
Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - C1.1 Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - C1.2. Analyzing low-average complexity electronic circuits and systems, in order to design and measure them. - C1.3. Troubleshooting and repairing certain electronic circuits, equipment and systems. - C1.4. Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. **C2. Applying basic methods for the acquisition and processing of signals:** - C2.1. The temporal, spectral and statistic characterization of signals. - C2.2. Explaining and interpreting methods for the acquisition and processing of signals. - C2.4. Using specific methods and instruments for signal analysis. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - C3.3. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers.
Transversal skills	- Methodical analysis of the problems encountered in the activity, identifying the elements for which there are established solutions, thus ensuring the fulfillment of professional tasks. - Ability to adapt to new technologies and to document oneself

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

7.1 The general objective of the subject	▪ The aim of the course is to present the main means and methods of electrical measurement of electrical and non-electrical quantities, giving greater importance to digital means and methods of measurement.
7.2 Specific objectives	After completing the discipline students will be able to: • Know how to identify measuring devices and read the indication of a measuring device • Know how to use measuring instruments according to the measured quantity • Know how to interpret the result of a measurement and the related error • Be able to estimate the quality and accuracy of the measurement process • Evaluate the accuracy of measurements • Ability to use knowledge related to the technique of electrical and electronic measurements in industrial fields in order to achieve simple projects.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction. Sizes and units of measure. Means and methods of measurement.	Interactive lecture + video projector / Online	2
2. Measurement errors. Classification of errors. Mathematical analysis of errors. Random errors. Systematic errors. Processing results.	Interactive lecture + video projector / Online	2
3. General characteristics of the measuring instruments. Block schemes. Static features. Behavior in dynamic mode. Constructive features.	Interactive lecture + video projector / Online	2
4. Circuits for expanding the current measuring range. The simple shunt. Multiple shunt. Transformers for measuring current. Rogowski transducers.	Interactive lecture + video projector / Online	2
5.Circuits for expanding the voltage measuring range. Additional resistor. Resistive, capacitive, inductive voltage dividers. Attenuators. Transformers for voltage measurement.	Interactive lecture + video projector / Online	2
6. Electronic circuits used in measuring devices. Instrumental Amplifiers. Rectifier precision bi-alternance.	Interactive lecture + video projector / Online	2
7. Converters for numerical measurements. Numeric-analog converters. Analog-numeric converters. Voltage-frequency converters.	Interactive lecture + video projector / Online	2
8. Measurement of voltages and currents. Analogue ammeters. Electronic ammeters for measuring small and very small currents. Measuring high currents. Analog voltmeters. Electronic voltmeters. Numeric multimeters.	Interactive lecture + video projector / Online	2
9. Measurement of electrical power. Measurement of active power.	Interactive lecture +	2

Measurement of reactive power.	video projector / Online	
10. Measurement of electrical energy. Counters	Interactive lecture + video projector / Online	2
11. Measurement of resistances: volt-ampermetric method, ohmmeters, mega ohmmeters. Wheatstone bridge, double bridge, resistance-to-voltage converters.	Interactive lecture + video projector / Online	2
12. Measurement of inductances and capacities. AC power bridges. General. Examples of AC bridges for capacitance and inductance measurements.	Interactive lecture + video projector / Online	2
13. Measurement of frequency, period and phase-out. Analog and numerical methods for frequency, period and phase measurement.	Interactive lecture + video projector / Online	2
14. Measurements of amplitude and frequency modulated signals.	Interactive lecture + video projector / Online	2
Bibliography 1. M. Tomşe – Măsurări electrice şi electronice, curs, format electronic, https://prof.uoradea.ro/mtomse 2. M. Tomse, M. Gordan - Măsurări electrice şi electronice, *Editura Universităţii Oradea*, 2004. 3. M. Antoniu – Măsurări electronice, vol. 1, 2, 3, *Editura Santya*, Iaşi, 2002. 4. M. Sărăcin – Măsurări electronice, *Litografia Universităţii Politehnice Bucureşti*, 1997.		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory. Labor protection. General information on laboratory activity.	Work in groups of 3-4 students, explanations and discussions, individual work for the preparation of laboratory references and area-measurements of experimental measurements. Interaction with studies on the issues addressed, materials distributed to students, consultation hours.	2
2. Metrological verification of measuring instruments.		2
3. Measurement of resistances by the volt-ammeter method. Measurement of resistances with simple direct current bridge.		2
4. Checking the digital oscilloscope		2
5. Measurements with the oscilloscope.		2
6. Power measurement in a.c. single phase with the wattmeter.		2
7. Thermoelectric transducers. Closing the situation at the laboratory.		2
Bibliography 1. M. Tomșe – Măsurări în electronică și telecomunicații, îndrumător de laborator, *Editura Universităţii Oradea 2018,* . ISBN 978-606-10-2006-5 – Format electronic. 2. M. Tomșe – Măsurări electrice și electronice, îndrumător de laborator, *Editura Universităţii din Oradea 2019,* ISBN 978-606-10-2081-2 – Format electronic. 3. M. Gordan, M. Tomșe, C. Mich și V. Ferenc. - Măsurări electrice şi sisteme de măsurare, îndrumător de laborator, *Litografia Universităţii Oradea*, 2003. 4.. M. Tomșe – Măsurări electrice și electronice, curs, format electronic, https://prof.uoradea.ro/mtomse		

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 what is taught in other faculties of electrical profile both from the University of Oradea and from other university centers in the country and abroad. For a better adaptation to the labor market requirements of the content of the discipline, meetings were held with representatives of the industrial and business environment in Bihor.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1. The level and quality of acquired knowledge reflected in the answers to the exam. 2. Activity during the semester + course reports	Written exam / Online assessment (Online questionnaire)	60% 10%
10.5 Academic seminar			-
10.6 Laboratory	Theoretical and practical knowledge acquired through individual study and laboratory work. Obtaining a minimum grade of 5 in the laboratory gives the right to participate in the exam.	Tests to assess theoretical and applied knowledge during the semester. Final assessment test / Assessment by tests and	30% 10% of the mark for the laboratory is awarded for the successful completion of the

		online questionnaire	individual study topic
10.7 Project			
10.8 Minimum performance standard: Course - Requirements for grade 5 :: Knowledge of the operation of the main measuring instruments and measuring methods for voltage, current, power and impedances. Laboratory - Requirements for grade 5: Carrying out reports and carrying out all laboratory work. Carrying out the measurements and including the results in the report.			

Completion date
05.09.2022

Signature of the course holder
S.l. dr. ing. Tomse Marin
mtomse@yahoo.com

Signature of the laboratory holder
S.l. dr. ing. Tomse Marin
mtomse@yahoo.com

Date of endorsement in the department:
19.09.2022

Signature of the department director
Prof.dr.ing. Daniel Trip
dtrip.uo@gmail.com

Date of endorsement in the Faculty Board:
23.09.2022

Signature of the Dean
Prof.dr.ing. Mircea Gordan
mirgordan@gmail.com

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	Electronics and Telecommunications
1.4 Field of study	Electronical Engineering, Telecommunications and Information Technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / 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	4	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	5	of which: 3.2 course	2	3.3 academic seminar/laboratory	2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory	28/14

Distribution of time	30 hours
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	10
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	(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 the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. **C2. Applying basic methods for the acquisition and processing of signals:** - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used.
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 applied electronics, 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 methods in electronic engineering problems; ➢ Using the Matlab programming language for numerical calculation in electronic 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. Numerical methods to solve nonlinear equations.	Interactive lecture + video projector / Online	2

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

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

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Introduction in Matlab programming	Application programs using Matlab	2
2. Numerical methods to solve algebric linear systems equations. Exact methods. Iterative methods.	Application programs using Matlab	2
3. Matlab programs for polynomial interpolation	Application programs using Matlab	2
4. Matlab programs for linear regression and polynomial regression	Application programs using Matlab	2
5. Matlab programs for solving numerical integration and derivation	Application programs using Matlab	2
6. Numerical methods to solve differential equations	Application programs using Matlab	2
7. Evaluation of laboratory activity.		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

8.3 Seminar	Teaching methods	No. of hours/ Observations
1.Study topics and bibliography. Guidelines for testing knowledge in seminar activities	Free presentation, with exemplification on the board. Interactive method.	2
2. Errors in numerical calculation. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2

3. Numerical methods to solve algebric linear systems equations. Exact methods. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
4. Numerical methods to solve algebric linear systems equations. Iterativet methods .Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
5. Numerical methods to solve nonlinear equations. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
6. Interpolation. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
7. Functions approximation. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
8. Numerical integration. Applications.	Free presentation, with exemplification on the board. Interactive method.	2
9. Numerical derivation. Applications.	Free presentation, with exemplification on the board. Interactive method.	2
10. Numerical methods to solve differential equations. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
11. Evaluation		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 %
10.5 Seminar	Realization of all seminar applications	Continuous testing of the theory throughout the semester	15%
10.6 Laboratory	Realization of all laboratory applications	Practical application	15 %
10.8 Minimum performance standard:			

Completion date:
29.08.2022

Date of endorsement in the department:
1.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject			Object oriented programming				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	II	2.5 Semester	4	2.6 Type of the evaluation	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 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
Study using the manual, course support, bibliography and handwritten notes					9
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					3
Tutorials					-
Examinations					3
Other activities.					-

3.7 Total of hours for individual study	30
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	projector

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

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming. - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. - Carrying out projects that involve hardware components (processors and software components (programming).
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	In order to increase the productivity of software writing, it is necessary to overcome the shortcomings of structured programming through object-oriented programming facilities, the second being seen as an extension of the first. The course is intended to be taught to second year students, Domain / Specialization: AE. It addresses object-oriented programming techniques for creating applications using Visual Studio 2019.
7.2 Specific objectives	1. Knowledge and understanding - knowledge and understanding of the notions of OOP 2. Explanation and interpretation - explaining the mathematical apparatus used - interpretation of results - interpretation of specific formulas 3. Instrumental - applications - development of abstraction skills - formation of calculation skills 4. Attitudinal - developing a positive attitude - cultivating and promoting a scientific environment focused on values - forming a positive and responsible behavior.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Object Oriented Programming	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture leaves room for student intervention for a better understanding of the notions presented by the teacher. The activity can also be carried out online.	4
2. C ++ classes		2
3. Association-aggregation-derivation		4
4. MFC programming		4
5. Menus in MFC		4
6. Dialog boxes in MFC		2
7. Property sheets		4
8. The wizard		2
9. Controls oriented on value ranges. The evolution bar		2
10. Slider		2
11. Increment control		4
12. Serialization of data structures		2

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 19992007
1. 3. M. Curila S. Curila, "*Programarea in C şi C ++*", Editura Universităţii din Oradea, 2008, 300 pagini, ISBN 978-973-759-554

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introduction to Object Oriented Programming, MFC	The laboratory is organized in the first part of a short teacher-student debate on algorithms. Then the students will implement the algorithms, will note the results in their personal notebooks and will present them to the teacher. The activity can also be carried out online.	2
2. Introduction to MFC		2
3. Menus		2
4. Dialog boxes		2
5. Property sheets		2
6. The wizard		2
7. Controls oriented on value ranges		2

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 19992007
3 M. Curilă, **S. Curilă**, "*Programarea în C si C ++* ", Editura Universităţii din Oradea, 2008, 292 pagini, ISBN 978-973-759-554-6
4 R.-D. Albu, M. Curilă, **S. Curilă**, "*Programarea în C ++ Indrumator de laborator*", Editura Universităţii din Oradea, 2009, 150 pagini, ISBN 978-973-759-818-9

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	In order to obtain grade 5, the following conditions must be met: - obtaining at least a grade of 5 in the laboratory test; - knowledge of the basic notions regarding Object Oriented Programming, C ++ Classes. In order to obtain grades 6, 7, 8 or 9, the students will present two subjects extracted from the package	written	80%

	prepared with subjects that contain notions of course. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course. The activity can also be carried out online.		
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	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2022

Prof.univ. dr. Sorin CURILĂ
e-mail scurila@uoradea.ro,
http://scurila.webhost.uoradea.ro/

Date of endorsement in the department:
19.09.2022

Department Director,
Prof.univ.dr.ing. Daniel TRIP
E-mail: dtrip@uoradea.ro Pagina web:
http://dtrip.webhost.uoradea.ro/

Date of endorsement in the Faculty Board:
23.09.2022

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 Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, Telecommunications and Information Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**APPLIED ELECTRONICS/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**SIGNALS AND SYSTEMS I**			
2.2 Holder of the subject				Professor eng.PhD CORNELIA EMILIA GORDAN			
2.3 Holder of the academic seminar/laboratory/project				Lecturer eng.PhD LUCIAN MORGOȘ			
2.4 Year of study	II	2.5 Semester	3	2.6 Type of evaluation	EX.	2.7 Subject regime	I

(I) Imposed; (O) Optional;

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 laboratory	1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 laboratory	14
Distribution of time					58 hours
Study using the manual, course support, references and handwritten notes					18
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					-
Examinations					12
Other activities.					-

3.7 Total hours for individual study	**58**
3.9 Total 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	video projector, laptop, smart board
5.2.for the development of the academic laboratory	The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students with the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	**C1. Use of basic elements related to electronic devices, circuits, systems, instrumentation and technology** - Description of electronic devices operation and circuits and of the fundamental methods for measuring electrical quantities -Use of electronic tools and specific methods to characterize and evaluate the performance of electronic circuits and systems -Design and implementation of electronic circuits of low / medium complexity using the standards in the field **C2. Application of basic methods for signal acquisition and processing.** - Temporal, spectral and statistical characterization of signals. - Explanation and interpretation of signal acquisition and processing methods. - Use of simulation media for signal analysis and processing. - Use of specific methods and tools for signal analysis. - Design of basic functional blocks for digital signal processing with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques.** – Development of programs in a general and / or specific programming language, starting from the specification of the requirements and to the execution, troubleshooting and interpretation of the results in correlation with the processor used. - Carrying out projects involving hardware (processors) and software (programming).

Trans-versal skills	

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

7.1 General objective of the subject	• The course is taught to second year students *Applied Electronics*. The course addresses notions that will allow future graduates to use the fundamentals of electronic, telecommunications devices, circuits and instrumentation needed for signal analysis, processing and synthesis, to characterize time and frequency signals and to use methods and tools. specific for the analysis and synthesis of signals, continuous or discrete, periodic or aperiodic.
7.2 Specific objectives	- Use of simulation media (Matlab) for analog or digital analysis and processing of signals. - Ability to develop programs in an object-oriented programming language, starting from the specification of requirements and to the execution, debugging and interpretation of results. - Developing a positive attitude towards the activities of assimilating new professional knowledge and information, cultivating and promoting a scientific environment focused on values, forming a positive and responsible professional behavior.

8. Contents*

8.1 **Course** (on site/ on-line)	Teaching methods	No. of hours/ Observations
Generalities I. – Continuous and discrete time elementary signals (unity step, unity impuse, ramp, signum, exponential, sampling function).	Interactive lecture; exposure; video projector presentation	2 hours
Generalities II. – Discrete and continuous time variables transforms; signals power.	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time periodical signals I. Fourier series (trigonometrical, harmonic, complex); Amplitude and phase spectra definition.	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time periodical signals II. - Fourier series properties (simmetry, liniarity, Parseval theorem, Gibbs phenomenon, time translation, complex conjugation, reflection, scalation, modulation, derivation, integration, LMS approximation); Power spectral distribution;	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time periodical signals III. Periodical signals convolution; Complexe Fourier series coefficients calculation using Dirac distribuţion; Correlation functions	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time aperiodical signals I: Fourier transform (definitions, existance conditions, amplitude and phase spectra, properties).	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time aperiodical signals II: Laplace transform (definitions, conditions of existence, properties); Correlation functions..	Interactive lecture; exposure; video projector presentation	2 hours
Continuous time aperiodical signals III. Harmonic modulated signals (amplitude, frequency, phase); Definitions: modulation coefficients, spectral content, frequency bands, effective values.	Interactive lecture; exposure; video projector presentation	2 hours
Discrete time periodical signals definitions. Fourier series for discrete periodical signals: properties; discrete time periodical convolution.	Interactive lecture; exposure; video projector presentation	2 hours
Discrete time Fourier transform. Fourier transform for discrete periodical and aperiodical signals; discrete time Fourier transform properties.	Interactive lecture; exposure; video projector presentation	2 hours
Discrete signals I. – Sampled signals definition; direct and inverse Fourier transforma definitions; Sampling Theorem.	Interactive lecture; exposure; video projector presentation	2 hours
Discrete signals II. – Z transform (direct and inverse forms definitions; properties).	Prelegere interactivă; expunere	2 hours
Discrete signals III. - Impulse carrier modulated signals (amplitudine, position).	Prelegere interactivă; expunere	2 hours
Discrete signals IV. – Impulse carrier modulated signals (frequency, duration, code, delta).	Prelegere interactivă; expunere	2 hours

References

1. **Semnale, circuite şi sisteme**, *C. Gordan*, Editura Universităţii din Oradea 2000.
2. **Semnale şi Sisteme**, *Al.Isar, C.Gordan., I.Naforniţă*, Editura Orizonturi Studenţeşti Timişoara 2006,ISBN 973-638-324-9
3. **Semnale şi sisteme – Aplicaţii în filtrarea semnalelor**, *Ad.Mateescu, ş.a.,* Editura Teora Bucureşti, 2001.
4. **Analiza şi sinteza semnalelor**, *C.Gordan, R.Reiz,* Editura Universităţii din Oradea 2008, ISBN 978-973-759-642-0.

8.2 Seminar	Teaching methods	No.of hours/ Observations
8.3 Laboratory (on site/ on-line)		
1. Continuous periodical signals spectral analysis.	Practical application. Discussions	2 hours
2. Continuous aperiodical signals spectral analysis.	Practical application. Discussions	2 hours
3. Harmonic carrier amplitude modulated signals. Product amplitude modulation,	Practical application. Discussions	2 hours

4. Harmonic carrier frequency and phase modulated signals.	Practical application. Discussions	2 hours
5. Sampled signals spectral analysis.	Practical application. Discussions	2 hours
6. Impulse modulated signals spectral analysis.	Practical application. Discussions	2 hours
7. Recovery of laboratories. Ending the school situation.	Practical application. Discussions	2 hours
8.4 Project		

References

1 **Semnale şi Sisteme I**, *C.Gordan*, *R.Reiz,* Îndrumător de laborator, Editura Universităţii din Oradea 2017.
2. **Semnale şi Sisteme**, *Al.Isar, C.Gordan., I.Naforniţă*,Editura Orizonturi Studenţeşti Timişoara 2006,ISBN 973-638-324-9
3 **Analiza şi sinteza semnalelor**, *C.Gordan, R.Reiz,* Editura Universităţii din Oradea 2008, ISBN 978-973-759-642-0.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Cours	For 10: Active participation in the developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basics on all topics covered.	Oral or written evaluation, online or on-site. Discussions. Argue.	60 %
10.5 Seminar	-	-	-
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the requirements imposed by all laboratory works. Well-documented arguments. Reading the required bibliography. A percentage of 15% of the final grade at the laboratory is awarded for the successful completion of all the topics provided for individual study.	Written test. Practical test. Discussions. Online or on-site argumentation	40%
10.7 Project	-	-	-

10.8 Minimum performance standard:

Laboratory: obtaining a 5 grade in each laboratory testparticipation and fulfillment of all requirements imposed by each laboratory work; minimum knowledge regarding the temporal and spectral analysis of some continuous periodic or aperiodic signals, of some MA, MF, MP signals, of some simple sampled signals, respectively of the discrete amplitude modulated signals.

Cours: obtaining a 5 grade in each course test, as an arithmetic mean of the grades obtained for this type of activity. Knowledge of the basic notions regarding the analysis and synthesis of continuous periodic or aperiodic signals (Fourier series, Fourier and Laplace transforms), of modulated signals with harmonic carrier MA, MF, MP, of sampled and discrete signals, respectively of modulated pulses MIA, MIF, MIP , MID.

Completion date: 06.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, Telecommunications and Information Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**APPLIED ELECTRONICS/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**SIGNALS AND SYSTEMS II**			
2.2 Holder of the subject				Professor eng.PhD CORNELIA EMILIA GORDAN			
2.3 Holder of the academic seminar/laboratory/project				Professor eng.PhD CORNELIA EMILIA GORDAN /Lecturer eng. PhD LUCIAN MORGOŞ			
2.4 Year of study	II	2.5 Semester	4	2.6 Type of evaluation	EX.	2.7 Subject regime	I

(I) Imposed; (O) Optional;

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3seminar/laboratory	1/1
3.4 Total of hours from the curriculum	56	of which: 3.5course	28	3.6seminar/laboratory	14/14
Distribution of time					44 hours
Study using the manual, course support, references 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					12
Tutorials					-
Examinations					8
Other activities.					-

3.7 Total hours for individual study	**44**
3.9 Total 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	video projector, laptop, smart board
5.2.for the development of the academic laboratory	The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students with the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	**C1. Use of basic elements related to electronic devices, circuits, systems, instrumentation and technology** - Description of electronic devices operation and circuits and of the fundamental methods for measuring electrical quantities -Use of electronic tools and specific methods to characterize and evaluate the performance of electronic circuits and systems -Design and implementation of electronic circuits of low / medium complexity using the standards in the field **C2. Application of basic methods for signal acquisition and processing.** - Temporal, spectral and statistical characterization of signals. - Explanation and interpretation of signal acquisition and processing methods. - Use of simulation media for signal analysis and processing. - Use of specific methods and tools for signal analysis. - Design of basic functional blocks for digital signal processing with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques.** – Development of programs in a general and / or specific programming language, starting from the specification of the requirements and to the execution, troubleshooting and interpretation of the results in correlation with the processor used. - Carrying out projects involving hardware (processors) and software (programming).

Trans-versal skills	

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

7.1 General objective of the subject	• The course is taught to second year students *Applied Electronics*. The course addresses notions that will allow future graduates to use the fundamentals of electronic, telecommunications devices, circuits and instrumentation needed for signal analysis, processing and synthesis, to design passive filters (k constant, m derived, bridge, composed), II order active (single and multiple reaction, ordered voltage source) or digital.
7.2 Specific objectives	- Use of simulation media (Matlab) for analog or digital analysis and processing of signals. - Design of basic functional blocks for analog and digital signal processing - Ability to develop programs in an object-oriented programming language, starting from the specification of requirements and to the execution, debugging and interpretation of results. - Developing projects including hardware (processors) and software (programming) components. - Developing a positive attitude towards the activities of assimilating new professional knowledge and information, cultivating and promoting a scientific environment focused on values, forming a positive and responsible professional behavior.

8. Contents*

8.1 **Course** (on site/ on-line)	Teaching methods	No. of hours/ Observations
Passive electrical filters I -Generalities I. K constant filters (general analysis)	Interactive lecture; exposure; video projector presentation	2 hours
Passive electrical filters II - K constant filters (low pass, high pass, band pass, band stop)	Interactive lecture; exposure; video projector presentation	2 hours
Passive electrical filters III – m derivated filters (generalities, serial and parallel m derivations, low pass, high pass, band pass)	Interactive lecture; exposure; video projector presentation	3 hours
Passive electrical filters IV – bridge filters (generalities, low pass, high pass, band pass)	Interactive lecture; exposure; video projector presentation	3 hours
Active electrical filters I – Generalities; Voltage transfer functions (Butterworth, Cebîsev, Bessel, Paynter, etc)	Interactive lecture; exposure; video projector presentation	2 hours
Filtre electrice active II – Single reaction II order active filter (generalities, low pass, high pass, band pass)	Interactive lecture; exposure; video projector presentation	3 hours
Filtre electrice active III – Multiple reaction II order active filter (generalities, low pass, high pass, band pass)	Interactive lecture; exposure; video projector presentation	3 hours
Filtre electrice active IV – Ordered voltage source II order active filter (generalities, low pass, high pass, band pass)	Interactive lecture; exposure; video projector presentation	3 hours
Discrete filters I. – Generalities. Transforming continuous time systems in discrete time systems.	Interactive lecture; exposure; video projector presentation	3 hours
Discrete filters II. – Filtering recursive systems	Prelegere interactivă; expunere	2 hours
Discrete filters III. – Filtering non-recursive systems	Prelegere interactivă; expunere	2 hours

References

1. **Semnale, circuite şi sisteme**, *C. Gordan*, Editura Universităţii din Oradea 2000.
2. **Semnale şi Sisteme**, *Al.Isar, C.Gordan., I.Naforniţă*, Editura Orizonturi Studenţeşti Timişoara 2006,ISBN 973-638-324-9
3. **Semnale şi sisteme. Aplicaţii în filtrarea semnalelor**, *Ad.Mateescu, ş.a.,* Editura Teora Bucureşti, 2001.
4. **Filtre**, *C.Gordan, R.Reiz,* Editura Universităţii din Oradea 2006, ISBN 973-759-176-0.

8.2 Seminar (on site/ on-line)	Teaching methods	No.of hours/ Observations
1. Passive filters (k constant, m derivated, bridge)	Practical application. Discussions	4 hours
2. Active filters (single and multiple reaction, ordered voltage source)	Practical application. Discussions	6 hours
3. Digital filters	Practical application. Discussions	4 hours
8.3 Laboratory (on site/ on-line)	Teaching methods	No.of hours/ Observations
1.K constant and m derivate filters	Practical application. Discussions	2 hours
2. m derivated and bridge filters.	Practical application. Discussions	2 hours
3. Butterworth and Cebîsev voltage transfer functions design	Practical application. Discussions	2 hours
4. Single and multiple reaction second order active filters design.	Practical application. Discussions	2 hours
5.Ordered voltage source second order active filters design.	Practical application. Discussions	2 hours
6. Recursive and non-recursive digital filters design.	Practical application. Discussions	2 hours
7. Recovery of laboratories. Ending the school situation.	Practical application. Discussions	2 hours
8.4 Project		
References		

1 **Semnale şi Sisteme II**, R.Reiz, C.Gordan, Îndrumător de laborator, Biblioteca departamentului şi a universităţii 2010.
2**. Filtre**, *C.Gordan, R.Reiz,* Editura Universităţii din Oradea 2006, ISBN 973-759-176-0..
3. **Semnale şi sisteme. Aplicaţii în filtrarea semnalelor**, *Ad.Mateescu, ş.a.,* Editura Teora Bucureşti, 2001.
4. ***Filtre***, R.Reiz, L.Morgoş, C.Gordan, Îndrumător de lucrări de laborator, Editura Universităţii din Oradea 2018, ISBN 978-606-10-2020-1.
5. **Semnale circuite si siteme C. Gordan**, R.Reiz, Culegere de probleme vol. II, Editura Universităţii din Oradea 2003, ISNB 973-613-246-3.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Cours	For 10: Active participation in the developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basics on all topics covered.	Oral or written evaluation, online or on-site. Discussions. Argue.	60 %
10.5 Seminar	Written test marked with a minimum of 5, as an average of all tests during the semester and taking into account the active-argumentative participation in seminars. A percentage of 7.5% of the final grade at the laboratory is awarded for the successful completion of all the topics given for individual study.	Written test. Discussions. Online or on-site argumentation	15%
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the requirements imposed by all laboratory works. Well-documented arguments. Reading the required bibliography. A percentage of 10% of the final grade at the laboratory is awarded for the successful completion of all the topics given for individual study.	Written test. Practical test. Discussions. Online or on-site argumentation	25%
10.7 Project	-	-	-

10.8 Minimum performance standard:

Laboratory: obtaining a 5 grade in each laboratory test participation and fulfillment of all requirements imposed by each laboratory work; minimum knowledge regarding the desing of passive, active and digital filters.
Seminar: obtaining a 5 grade in each seminar test, as an arithmetic mean of the grades obtained for this type of activity. Knowledge of the basic notions regarding the the desing of passive, active and digital filters.
Cours: obtaining a 5 grade in each course test, as an arithmetic mean of the grades obtained for this type of activity. Knowledge of the basic notions regarding the the desing of passive, active and digital filters..

Completion date: 08.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronical engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**SPICE MODELS**					
2.2 Holder of the subject		Șchiop Adrian					
2.3 Holder of the academic seminar/laboratory/project		Șchiop Adrian					
2.4 Year of study	2	2.5 Semester	4	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	4	of which: 3.2 course	4	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14

Distribution of time	hours
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	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	7
Tutorials	2
Examinations	2
Other activities.	0

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	
5.2.for the development of the academic seminary/laboratory/project	Room equipped with computers that have installed the OrCAD environment

6. Specific skills acquired	
Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Designing and implementing electronic circuits of low/average complexity using CAD_CAM technologies, as well as the standards applied in the domain. **C2. Applying basic methods for the acquisition and processing of signals:** - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis.
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	▪ Knowledge of the types of analyses that can be carried out in the OrCAD environment; ▪ Making printed circuit board for different electronic circuits; ▪ Knowing the significance of the model parameters of the usual electronic devices; ▪ Use of the catalog parameters of electronic devices to determine their model parameters;
7.2 Specific objectives	▪ The ability to perform and simulate an electronic scheme in the OrCAD environment ▪ The ability to design printed circuit board in PCB Editor.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Circuit Simulation Programs 1.1 Structure of a Simulation Program 1.2 Simulation Environments and Electronic Circuit Simulators 1.2.1 OrCAD Environment 1.2.2 CASPOC 1.2.3 PSIM 1.2.4 Matlab/ Simulink Environment	lecture, conversation, exposure, explanation, observation, algorithmization	2 hours
2. SPICE standard for defining electronic components and visualizing results 2.1 Definition of components in PSPICE 2.1.1 Resistors 2.1.2 Capacitors 2.1.3 Coils 2.1.4 Coupled coils 2.1.5 Transmission lines 2.1.6 Independent sources 2.1.7 Controlled sources 2.1.8 Switches 2.1.9 Semiconductor devices: semiconductor diodes, bipolar transistor, TEC-J field effect transistor, MOS, IGBT transistor 2.2 View simulation results 2.2.1 Output variables 2.2.2. PRINT command 2.2.3 . PLOT command 2.2.4 PROBE command.	lecture, conversation, exposure, explanation, observation, algorithmization	8 hours
3. Create and edit components	lecture, conversation,	2 hours

	exposure, explanation	
4. Generating electronic simulation schemas in OrCAD PSpice 4.1 Generating a low-complexity electronic schema 4.2 Generating hierarchical schemas 4.3 Generating concatenate schemas	lecture, conversation, exposure, explanation, observation, algorithmization	4 hours
5. Types of analysis in PSpice 5.1 DC analysis 5.2 Parametric analysis 5.3 Frequency analysis 5.4 Noise analysis 5.5 Time analysis 5.6 Fourier analysis 5.7 Statistical analysis 5.7.1 Definition of tolerances 5.7.2 Monte-Carlo analysis 5.7.3 Sensitivity analysis and the worst case	lecture, conversation, exposure, explanation, observation, algorithmization	8 hours
6. Footprints design	lecture, conversation,	1 hour
7. SCM – PCB Transfer Techniques 7.1 Electrical verification of the electronic scheme 7.2 Generation of postprocessing lists	lecture, conversation, exposure,	1 hour
8. Designing of Electronic Circuits in PCB Editor 8.1 PCB Design Block Editor 8.2 Creating outline 8.3 Placing Components 8.4 Routing of the Printed Circuit Board	lecture, conversation, exposure, explanation, observation, algorithmization	2 hour
Bibliography 1. A. Şchiop Proiectarea asistată de calculator a circuitelor electronice în mediul OrCAD, Editura Universităţii din Oradea, 2009 2. T. Marian SPICE, Editura Teora, 1996. 3. C. Rădoi, V. Grigore, V. Drogoreanu, SPICE Simularea şi analiza circuitelor electronice, Amco Press, Bucureşti, 1994. 4. I. Sztoianov, S. Paşca, Analiza asistată de calculator a circuitelor electronice, Editura Teora, 1997. 1. 5. A. Vladimirescu SPICE, Editura Tehnică, Bucureşti, 1999.		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Definition of electronic components	computer-assisted training	2
2. DC analysis	computer-assisted training	2
3. Parametric analysis, frequency analysis, noise analysis	computer-assisted training	2
4. Transient analysis, Fourier analysis	computer-assisted training	2
5. Hierarchical schemas	computer-assisted training	2
6. Generating concatenate schemas	computer-assisted training	2
7. Recovery of laboratories	computer-assisted training	2
Bibliography 1. 1. A. Şchiop Proiectarea asistată de calculator a circuitelor electronice în mediul OrCAD, Editura Universităţii din Oradea, 2009		
Academic project		
Performing a medium complexity project (schematic + printed wiring). Description of the project.	computer-assisted training	1

Scheme-making using components included in libraries Create new components SCM – PCB Transfer. Placing Footprints Components, Creating Outline PCB Routing	computer-assisted training	11
Project presentation	computer-assisted training	2
Bibliography 1. A. Şchiop Proiectarea asistată de calculator a circuitelor electronice în mediul OrCAD, Editura Universităţii din Oradea, 2009 2. http://userweb.eng.gla.ac.uk/john.davies/orcad/pcbdesigner.pdf 3. K Mitzner Complete PCB Design Using OrCAD Capture and PCB Editor , Elsevier Inc.		

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 acquired skills will be required for employees working in the field of design, simulation and analysis of electronic circuits.

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 The exam note contains an electronic scheme of medium complexity. Students will simulate the operation of the respective scheme and will achieve its wiring - Clarity, consistency, concision of presentation and explanation of subjects For 10: Total solving of the exam subject	Computer exam	60%
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): Verification at the end of each laboratory hour of the accuracy of the results obtained by simulation		10%

10.7 Project			30%
10.8 Minimum performance standard: Proper realization of the indicated schema , specifying the type of analysis performed, placement of markers: setting routing layers, clearance, drawing the outline, placing components			

Completion date:
15.09.2022

Date of endorsement in the department:
19.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty Of Electrical Engineering And Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronical Engeneering, Telecommunications And Information Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Basics of Data Acquisition Systems**					
2.2 Holder of the subject		**Lect. dr. eng. Țepelea Laviniu**					
2.3 Holder of the academic seminar/laboratory/project		**Lect. dr. eng. Țepelea Laviniu**					
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 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					69h
Study using the manual, course support, bibliography and handwritten notes					27
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					20
Tutorials					
Examinations					2
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 computer, appropriate software and video projector, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the situation of the Covid pandemic

5.2.for the development of the academic seminary/laboratory/project	Laboratory room equipped with computers and dedicated software, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the situation of the Covid pandemic

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Analyzing low-average complexity electronic circuits and systems, in order to design and measure them. - Troubleshooting and repairing certain electronic circuits, equipment and systems. - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. - Designing and implementing electronic circuits of low/average complexity using CAD_CAM technologies, as well as the standards applied in the domain. **C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming. - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. - Carrying out projects that involve hardware components (processors and software components (programming).
Transversal skills	**CT1**. The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks. **CT2**. Defining activities on stages and their distribution to subordinates, with the complete explanation of duties, depending on the hierarchy levels, thus ensuring the efficient exchange of information and interpersonal communication. **CT3**. Adaptation to the new technologies, professional and personal development by means of continuous education formation, using printed documents, specialized software and electronic resources both in Romanian and at least in one international foreign language.

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 presents the specific components of the structure of acquisition and control systems, the implementation of acquisition and control functions and techniques for connecting data acquisition and distribution systems to numerical processing equipment. ▪ The laboratory works have in view the deepening and completion of the theoretical knowledge in the course regarding the structure and operation of the components and systems of conversion, acquisition and data processing, the influence of disturbances on the acquisition and control processes.
7.2 Specific objectives	▪ Acquiring the specific problems of the acquisition and control systems; ▪ Understanding the characteristics of the components in the structure of a data acquisition system; ▪ Knowledge of the main structures of the data acquisition system; ▪ Understanding the general principles of communication interfaces; ▪ Practical testing of components in data conversion, acquisition and processing systems.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Data acquisition system (data acquisition and control systems, signal sampling, signal reconstruction, binary coding systems)	Lecture. Explication. Description. Exemplification.	2
2. Signal conditioning circuits (passive signal conditioning circuits, electronic switch and multiplexer, operational amplifiers, measuring amplifier)	Lecture. Explication. Description. Exemplification.	2
3. Signal conditioning circuits (programmable gain amplifier, modulation - demodulation amplifiers, - isolation amplifiers).	Lecture. Explication. Description. Exemplification.	2
4. Sampling and storage circuits (characteristics of sampling and storage circuits (EMC)) principles for achieving EMC)	Lecture. Explication.	2

	Description. Exemplification.	
5. Analog to digital converters (characteristics of analog to digital converters, analog to digital converter with binary weighted resistor network)	Lecture. Explication. Description. Exemplification.	2
6. Analog to digital converters (analog to digital converter with R-2R network, bipolar to digital converter)	Lecture. Explication. Description. Exemplification.	2
7. Analog to digital converters (characteristics of analog to digital converters, A / D converter with parallel comparison)	Lecture. Explication. Description. Exemplification.	2
8. Analog to digital converters (A / D converter with successive approximations, A / D converter with parallel series comparison).	Lecture. Explication. Description. Exemplification.	2
9. Analog to digital converters (sigma-delta A / D converter, two-slope A / D converter)	Lecture. Explication. Description. Exemplification.	2
10. Data acquisition and distribution systems (data acquisition systems with multiplexing of analog input signals, AD with multiplexing of CAN outputs, data distribution systems)	Lecture. Explication. Description. Exemplification.	2
11. Standard communication interfaces. RS-232 standardized interface.	Lecture. Explication. Description. Exemplification.	2
12. Standard communication interfaces. Standard interface I^2C. IEEE-488 standard interface.	Lecture. Explication. Description. Exemplification.	2
13. Data acquisition system for fast processes	Lecture. Explication. Description. Exemplification.	2
14. Data acquisition system for slow processes. Conclusions	Lecture. Explication. Description. Exemplification.	2

Bibliography

1. E. Pop, V. Stoica, I. Naforniţă, E. Petriu, *Modern measurement and control techniques*, Facla Publishing House, Timişoara, 1983
2. M. Bodea, et al., *Electronic measuring and control devices*, Didactic and Pedagogical Publishing House, Bucharest, 1985
3. G. Ionescu, et al., *Transducers for industrial automation*, Vol. I, Technical Publishing House, Bucharest, 1985
4. V. Tiponuţ, et al., *Electronic measuring and control devices*, Polytechnic Institute, Timisoara, 1986
5. M. Sîmpăleanu, *Circuits for data conversion*, Technical Publishing House, Bucharest, 1991
6. L. Toma, *Numerical signal acquisition and processing systems*, West Publishing House, Timisoara, 1996
7. T. Jurca, D. Stoiciu, *Measuring instruments, Structures and circuits*, West Publishing House, Timisoara, 1996
8. A. Gacsádi, V. Tiponuţ, *Data acquisition systems*, University of Oradea Publishing House, Oradea, 2005
9. A. Gacsádi, *Data acquisition systems, Laboratory supervisor*, University of Oradea Publishing House, Oradea, 2002
10. L. Ţepelea, A. Gacsádi, *Data acquisition systems, Laboratory supervisor*, Digital support, Oradea, 2013
11. R. Dogaru, I. Dogaru, A. Gacsádi, I. Gavrilut, *The structure and dynamics of complex dynamic networks. Nonlinear cellular networks*, Matrixrom Publishing, Bucharest, 2013.

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
8.3 Laboratory		

1. Presentation of laboratory works. The oscilloscope. Its description and operation.	Description. Explication. Exemplification. Verification.	2
2. Virtual instrumentation. Labview programming environment	Description. Explication. Exemplification. Verification.	2
3. Sampling. Reconstitution of the sampled signal	Description. Explication. Exemplification. Verification.	2
4. Sampling and storage circuits.	Description. Explication. Exemplification. Verification.	2
5. Binary coding systems	Description. Explication. Exemplification. Verification.	2
6. Digital to analog converters.	Description. Explication. Exemplification. Verification.	2
7. Analog to digital converters with two-slope integration	Description. Explication. Exemplification. Verification.	2
8. Creating a virtual tool	Description. Explication. Exemplification. Verification.	2
9. Making graphic representations. Local and global variables	Description. Explication. Exemplification. Verification.	2
10. DC Circuits in Labview	Description. Explication. Exemplification. Verification.	2
11. Data acquisition system using computer sound card	Description. Explication. Exemplification. Verification.	2
12. NI USB-6216 data acquisition system	Description. Explication. Exemplification. Verification.	2
13. NI USB-6361 data acquisition system	Description. Explication. Exemplification. Verification.	2
14. Laboratory recoveries. Verification of acquired knowledge	Description. Explication. Exemplification. Verification.	2

Bibliography

1. A. Gacsádi, *Data acquisition systems, Laboratory supervisor,* University of Oradea Publishing House, Oradea, 2002

2. L. Ţepelea, A. Gacsádi, *Data acquisition systems, Laboratory supervisor,* Digital support, Oradea, 2013

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

-

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The level and quality of student training in the course.	On-the-spot verification by two written tests or two grid tests in the case of online assessment	70%
10.5 Academic seminar	-	-	-
10.6 Laboratory	Assimilation of theoretical and practical knowledge following individual study and laboratory work.	A percentage of 10 % of the final grade from the laboratory is awarded for the successful completion of the individual study topic. Verification of the accumulation of knowledge and the ability to use practical applications.	30%
10.7 Project	-	-	-
10.8 Minimum performance standard: Course: Knowledge of specific components in the structure of acquisition and control systems Laboratory: Carrying out the laboratory applications provided in the discipline file			

Completion date:
16.09.2022

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Date of endorsement in the department:
19.09.2022

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Date of endorsement in the Faculty Board:

23.09.2022

Dean,
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mgordan@uoradea.ro
https://prof.uoradea.ro/mgordan/

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 The Department	**Department of Electronics and Telecommunications**
1.4 Do the study menu	**Electronic Engineering , Telecommunications and Information Technology**
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program / Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the discipline		Communication Systems					
2.2 The holder of the course activities		**sl.dr. Eng. Popa Sorin**					
2.3 The holder of the seminar / laboratory / project activities		**sl.dr. Eng. Popa Sorin**					
2.4 Year of study	**III**	2.5 Semester	**6**	2.6 Type of evaluation	**Vp**	2.7 Discipline regime	DD

3. Estimated total time (hours per semester of teaching activities)

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

Distribution of time fund	36 hours
Study by textbook, course support, bibliography and notes	15
Additional documentation in the library, on specialized electronic platforms and in the field	8
Preparation of seminars / laboratories, homework, papers, portfolios and essays	5
tutorial	3
Review	5
3.7 Total hours of individual study	**36**
3.9 Total hours per semester	**78**
3.10 Number of credits	**3**

4. Preconditions (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector
5.2. l for the development of the seminary / laboratory / project	Computer network, radio frequency spectrum analysis devices, analog and digital transmission equipment , telephone exchanges .

6. Specific skills acquired

Professional skills	**C.4. Design and use of low-complexity hardware and software applications specific to applied electronics :** - Identifying and optimizing hardware and software solutions to problems related to: industrial electronics, medical electronics, automotive electronics, automation, robotics, production of consumer goods . - Use of appropriate performance criteria for the evaluation, including by simulation, of hardware and software of dedicated systems or service activities using microcontrollers or computing systems of low or medium complexity . **C.5. Application of basic knowledge, concepts and methods in: power electronics, automated systems, electricity management, electromagnetic compatibility :** - Qualitative and quantitative interpretation of the operation of circuits in the fields: power electronics, automatic systems, electricity management, medical electronics, car electronics, consumer goods; analysis of the operation in terms of electromagnetic compatibility . - Elaboration of technical specifications, installation and operation of equipment in the fields of applied electronics: power electronics, automatic systems, electricity management, medical electronics, car electronics, consumer goods . **C.6. Solving technological problems in the fields of applied electronics :** - Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of appliances and equipment in the fields of applied electronics - Explaining and interpreting the production processes and maintenance activities of electronic equipment, identifying test points and electrical quantities to be measured .
Transversal skills	

7. Objectives of the discipline (based on the grid of specific skills acquired)

7.1 The general objective of the discipline	This discipline aims to familiarize students, from the applied Electronics specialization , with the basic notions in their telecommunications field , a necessary requirement for the training of any specialist in the field .
7.2 Specific objectives	Students will gain the ability to understand the operation , installation and programming of a telephone exchange.

8. Contents *

8.1 Course	Teaching methods The activity can also be carried out online.	Nr. Hours / Observations
1. Introduction. Development of communications technology and microelectronics.	Lecture, presentation, debate	2 hours
2. Terms and notions regarding communications.	Lecture, presentation, debate	2 hours
3. Transmission characteristics. Transmission lines. Communication services.	Lecture, presentation, debate	2 hours
4. Telephone equipment. The principle of multiplexing TDMA, FDMA, CDMA.	Lecture, presentation, debate	2 hours
5. Digital telephony. A / D conversion, sampling, quantization, coding.	Lecture, presentation, debate	2 hours
6. Digital transmissions. Transmission media. The quality of digital transmissions.	Lecture, presentation, debate	2 hours
7. Transfer modes for STM-ATM digital signals. Synchronous digital hierarchies	Lecture, presentation, debate	2 hours
8. Communication networks, structure and topology.	Lecture, presentation, debate	2 hours
9. Layered architectures, multiplexing and switching techniques.	Lecture, presentation, debate	2 hours
10. Digital transmission systems. Codes.	Lecture, presentation, debate	2 hours

11. Data communications, description, structure of a CD system.	Lecture, presentation, debate	2 hours
12. Networks for given communications. Data representation.	Lecture, presentation, debate	2 hours
13. Baseband transmission.	Lecture, presentation, debate	2 hours
14. Modulations used in data communications, ASK, PSK, FSK.	Lecture, presentation, debate	2 hours

Bibliography
1. AS Tanenbaum - "Computer Networks - Fourth Edition", Computer-Press Agora 1997
2. M. Schwartz - "Telecommunication Networks: Protocols, Modeling and Analysis", Addison-Wesley 1987
Analog and digital transmissions. Ed. Tehnica.1995
4. M. Ibnkahla - Signal Processing for mobile communications handbook. 2005
5. S.Popa - Contributions to the implementation and optimization of mobile communication networks. Ed.Pol.Tim. 2013.

8.2 Seminar	teaching methods	Nr. Hours / Obs.
-		
8.3 Laboratory	The activity can also be carried out online	
1. Presentation of the laboratory. Analog, digital signals. Modulations.	Practical application, web documentation.	2 hours
2. Transmission media. Noise.	Practical application, web documentation.	2 hours
3. Block diagram of radio receivers for MA-MF signals.	Practical application	2 hours
4. The tuner block. Radio receiver tuning interface.	Practical application	2 hours
5. Intermediate frequency amplifier (AFI). The decoder.	Practical application	2 hours
6. NRZ, RZ encoding in data transmissions.	Practical application	2 hours
7. Biphasic coding, Manchester, bipolar AMI in data transmissions.	Practical application	2 hours
8.4 Project		

Bibliography
Laboratory guide - electronic CD format

9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic 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 better complicated to adapt to market demands discipline content had meetings with employer representatives in the field.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods The activity can also be carried out online.	10.3 Weight in the final grade
10.4 Course	Verification of theoretical knowledge. Correct and complete treatment of exam topics related to telecommunications protocols and detailed knowledge of the principles of design, implementation and operation of the most used protocols and their applications .	Written evaluation.	70%

10.5 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.	Written evaluation (during semester): report. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic.	30%
10.7 Project	-	-	-
10.8 Minimum standard of performance : Knowledge of the fundamental elements of theory, terminology in the field, solving a simple technical problem. Interpretation of the technical documentation of a device .			

Completion date:

15.09.2020

Date of endorsement in the

department: 19.09.2020

Date of endorsement in the Faculty

Board: 23.09.2020

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject			Digital Signal Processing				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	III	2.5 Semester	5	2.6 Type of the evaluation	Examination	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	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					44
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					-
Examinations					5
Other activities.					-

3.7 Total of hours for individual study	39
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	-
4.2 related to skills	-

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture.
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 is expected to be taught to 3rd year AE specialization students. The course addresses notions about digital signal processing: Signals and systems, Discrete signal convolution, Convolution applications, Discrete signal correlation, Correlation applications, Fourier transform, Z transform, Eigenvectors - eigenvalues, Orthogonal unit transformations, Rectangular transformations , Transformations based on eigenvectors, Wavelet transformation.
7.2 Specific objectives	1. Knowledge and understanding - knowledge and understanding of the notions of PDS 2. Explanation and interpretation - explaining the mathematical apparatus used - interpretation of results - interpretation of specific formulas 3. Instrumental - applications

	- development of abstraction skills - formation of calculation skills 4. Attitudinal - developing a positive attitude - cultivating and promoting a scientific environment focused on values - forming a positive and responsible behavior.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Basic mathematical notions	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture leaves room for student intervention for a better understanding of the notions presented by the teacher. The activity can also be carried out online.	2
2. Matrix theory		2
3. The method of least squares. Algorithms Newton, Gradient		2
4. Random signals		2
5. Fourier transform, Z transform		2
6. Analysis in decorated components		2
7. Orthogonal unit transformations		2
8. Transformations based on eigenvectors		2
9. Karhunen-Loeve transformation		2
10. Wavelet transformations continue		2
11. Discrete Wavelet Transforms		2
12. Multiresolution analysis		2
13. Sub-band coding. Lower half band		2
14. Upper half band		2
Bibliography 1. C. E. Gordan : Prelucrarea numerica a semnalelor, Ed. Univ. Oradea, 2003 2. A. Vlaicu : "Prelucrarea digitală a imaginilor", Editura Albastră, Cluj – Napoca, 1997. 3. M. Curila, S. Curila : Prelucrarea digitala a imaginilor degradate de aerosoli atmosferici, Ed. Univ. Oradea, 2004		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Basic mathematical notions	The laboratory is organized in the first part of a short teacher-student debate on algorithms. Then the students will implement the algorithms, will note the results in their personal notebooks and will present them to the teacher. The activity can also be carried out online.	4
2. The least squares method. Algorithms Newton, Gradient		4
3. Fourier transform		4
4. Karhunen-Loeve Transform		4
5. Multi-resolution decomposition using wavelets		4
6. Compression of mono and two-dimensional signals using wavelets		4
7. Recovery and conclusion of the situation at the laboratory.		4
Bibliography 1. C. E. Gordan : Prelucrarea numerica a semnalelor, Ed. Univ. Oradea, 2003 2. A. Vlaicu : "Prelucrarea digitală a imaginilor", Editura Albastră, Cluj – Napoca, 1997. 3. M. Curila, S. Curila : Prelucrarea digitala a imaginilor degradate de aerosoli atmosferici, Ed. Univ. Oradea, 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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	In order to obtain grade 5, the following conditions must be met: - obtaining at least a grade of 5 in the laboratory test; - knowledge of the basic notions regarding Signals and systems, Convolution of discrete signals, Correlation of discrete signals, Fourier transform. In order to obtain grades 6, 7, 8 or 9, the students will present two subjects extracted from the package prepared with subjects that contain notions of course. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course. The activity can also be carried out online.	written	80%
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	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2022

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Date of endorsement in the department:
19.09.2022

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Date of endorsement in the Faculty Board:
23.09.2022

Dean,
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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 Electronics and Telecommunications**
1.4 Field of study	**Electronical Engineering, Telecommunications and Information Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Electrical drives**					
2.2 Holder of the subject		**Lect. PhD eng. Viorica Spoială**					
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	**VP**	2.7 Subject regime	**DS**

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

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

Distribution of time	58
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**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 electrotechnics, electrical machines, electronics, electrical measurements
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 laboratory	- Mandatory presence at all laboratories; - 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	**C4.** Designing and using some hardware and software applications of reduced complexity, specific to applied electronics **C5.** Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility **C6.** Solving technological problems in the fields of applied electronics
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 has as objective the students familiarization with the field of electrical drives, regarding the structure, the working principle and the electronic control of different types of electrical drives (with DC, AC, stepper, linear, piezoelectric motors).
7.2 Specific objectives	• Identification and optimization of the hardware and software solutions connected with electrical drives. • Defining specific elements that individualize the electronic equipments and circuits used in the field of electrical drives • Qualitative and quantitative interpretation of the circuits functioning in the electrical drives • Elaboration of the technical specifications, installing and exploiting of the equipments used in the field of electrical drives. • Explanation and interpretation of the production processes and of the maintenance activities for electronic devices, in order to identify the testing points and the measuring electrical quantities in the field of electrical drives. • Management principles application for the production activities organization from the technological point of view, exploitation and service in the field of electrical drives.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Specific elements of electrical drives - structure - automated electrical drives systems - motion equations - mechanical characteristics - electronic devices used in electrical drives - applications	Free exposure, with the presentation of the course with video projector, on the board	6 h
2. DC machines electrical drives - working characteristics - starting methods, speed control methods, braking methods - applications	Free exposure, with the presentation of the course with video projector, on the board	6 h

3. Induction machines electrical drives **-** working characteristics - starting methods, speed control methods, braking methods - vectorial speed control - applications	Free exposure, with the presentation of the course with video projector, on the board	8 h
4. Brushless synchronous machines electrical drives **-** working characteristics - starting methods, speed control methods, braking methods - vectorial speed control - applications	Free exposure, with the presentation of the course with video projector, on the board	4 h
5. Special machines electrical drives **-** stepper motors electrical drives - linear motors electrical drives - piezoelectric motors electrical drives - applications	Free exposure, with the presentation of the course with video projector, on the board	4 h
Total		**28 h**

Bibliography

1. Spoială Viorica, **Acționări electrice**, electronic course, 2021
2. Spoială Viorica, Spoială D., **Sisteme de acţionare electrică-probleme fundamentale**, Litografia Universităţii din Oradea, 2002
3. Silaghi H., Maghiar T., Spoială Viorica, **Acţionări electrice-probleme fundamentale şi noţiuni de proiectare**, Ed. Universităţii din Oradea, 2002
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
7. Helga Silaghi, Viorica Spoială, Dragoş Spoială, **Acţionări electrice avansate**, Editura Universităţii din Oradea, 2019

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. Comutation and protection devices used in electrical drives. Types of electric schemes used in electric drives.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h
2. Methods and schemes for starting electrical drives with DC motors. Matlab/Simulink simulation of transient processes in DC motors electrical drives.		2 h
3. Speed control of DC motors electrical drives supplied by PWM converters.		2 h
4. Speed control of induction motors electrical drives supplied by frequency converters.		2 h
5. Digital control of electrical drives with permanent magnet synchronous motors, using Unidrive M700		2 h
6. Microcontroller control of stepper motors electrical drives.		2 h
7. Recoveries and closing the situation at the laboratory.		2 h
Total		**14 h**

Bibliography

1. Viorica Spoială, Helga Silaghi, Dragoş Spoială – **Acţionări electrice**. Indrumător de laborator. Universitatea din Oradea, ISBN 978-606-10-1432-3, Ediţie CD-ROM, 140 pag, 2014
2. Viorica Spoială, **Acționări electrice**, electronic laboratory guidance, 2021

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 Applied Electronics of other university centers that have accredited these specializations and knowledge of all the types of electric drives and their operation and design is an important requirement 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	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 mark is calculated as the mean of the 2 marks obtained from the both verifications.	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** 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:

- The knowledge of the constructive parts and of the working principle of different types of electrical machines and electronic converters used in electrical drives.
- The ability to identify a specific type of an electrical drive (with DC, AC or special electrical machines) and to know the speed control posibilities of these, a very important aspect in modern electrical drives.
- The ability to write the motion equation for an electrical drive system with rotating or translating motion.
- Students participation at least a half of courses.

Laboratory:

- The ability to design, to read and to troubleshoot an electric command scheme of an electrical drive.
- The ability to make a practical electric assembly for an electrical drive scheme.
- Participation at all laboratories.

Completion date:
29.08.2022

Date of endorsement in the department:
12.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Image Processing and Analysis**						
2.2 Holder of the subject	Prof.dr.ing. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Prof.dr.ing. Cristian Grava						
2.4 Year of study	III	2.5 Semester	6	2.6 Type of 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 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	28
Distribution of time (in hours)					44
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					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
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	Signals and systems, Theory of information transmission, Computer programming and programming languages
4.2 related to skills	C2

5. Conditions (where applicable)

5.1. for the process of the course	equipped with video projector or Teams application. The course can be held face-to-face or online.
5.2. for the process of the seminary/laboratory/project	computer equipment, Matlab or Octave software Teams application. The laboratory can be carried out face-to-face or online.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** • The temporal, spectral and statistic characterization of signals. • Explaining and interpreting methods for the acquisition and processing of signals. • Using simulation environments for the analysis and processing of signals. • Using specific methods and instruments for signal analysis. • Designing elementary functional blocks for the digital processing of signals with hardware and software implementation.

Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** • Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers • Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. • Carrying out projects that involve hardware components (processors and software components (programming). **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** • Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. • Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. • Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods.

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

7.1 The general objective of the subject	The general objective of this discipline is to familiarize students with the specific concepts of image processing and analysis starting from image acquisition (spectral representation and image discretization), passing images through specific image processing blocks (improving and restoring images, eliminating different types of noise), to the description of the individual components of a scene (image analysis).
7.2 Specific objectives	The specific objectives of this discipline are: presenting the structure of an image processing and analysis system, developing students' knowledge and skills to implement algorithms for image improvement, image segmentation, image compression, nonlinear image filters and of integral transformations of images.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction 1.1 The main problems of image processing 1.2 Image classification, image display, LUT processing	Lecture + interactive methods	2
2. Digitization of images 2.1 Sampling theorem, specific cases 2.2 Quantization	Lecture + interactive methods	2
3. Spatial representation of images. Properties of digital images	Lecture + interactive methods	2
4. Spectral representation of images 4.1 The one-dimensional continuous Fourier transform. property 4.2 The two-dimensional continuous Fourier transform. property	Lecture + interactive methods	2
5. Improving images 5.1 Point operators 5.2 Histogram-based operators 5.3 Space operators (linear filtering) 5.4 Frequency effect of space operators	Lecture + interactive methods	5
6. Nonlinear filters 6.1 Order order filters k. Weighted order filters. property 6.3 Domain order filters. Multi-stage and adaptive filters	Lecture + interactive methods	3
7. Elements of mathematical morphology 7.1 General. "Hit or Miss" transformation. Erosion. expansion 7.2 Derived morphological transformations: contour extractors 7.3 Opening and closing. Morphological skeletons	Lecture + interactive methods	4

Image segmentation: region approach 8.1 Image segmentation based on histogram 8.2 Growth and merger of regions	Lecture + interactive methods	2
9. Image segmentation: contour approach 9.1 Gradient methods. Compass type methods 9.2 Nonlinear methods	Lecture + interactive methods	2
10. Image compression 10.1 Binary image compression methods 10.2 Methods for compressing grayscale images	Lecture + interactive methods	4

Bibliography:
1. C. Grava, V. Buzuloiu, "Elements of image processing and analysis", Oradea University Publishing House, 2007
2. C. Vertan, "Image processing and analysis", Printech Publishing House, Bucharest, 1999
3. A. K. Jain, "Fundamentals of Digital Image Processing," Prentice-Hall Inc. Publishing, 1989
4. W.K. Pratt, "Introduction to Digital Image Processing", CRC Press, 2014
5. D. Sundararajan, "Digital Image Processing. A Signal Processing and Algorithmic Approach ", Springer, 2017
6. V. Tyagi, "Understanding Digital Image Processing", CRC Press, 2018
7. C. Solomon, T. Breckon, „Fundamentals of Digital Image Processing. A Practical Approach with Examples in Matlab ", John Wiley Ltd., 2011
8. 8. E.R. Dougherty, "Digital Image Processing Methods," Marcel Decker Inc., 2020

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Introductory notions of image processing. Introduction to MATLAB	Practical works for simulation and development of application programs, debates on the problems encountered and methods for solving them	2
2. Punctual techniques for image enhancement		2
3.Linear image filtering, image spectrum and frequency filtering		2
4. Nonlinear and morphological filtering of images		2
5. Region-oriented segmentation		2
6. Contour-oriented segmentation		2
7. Recovery of laboratory works		2
8.3. Academic project	Teaching methods	No. of hours/ Observations
1. Punctual techniques for image enhancement	Designing an imposed / chosen application. Theoretical and software development	2
2. Image enhancement using neighbourhood space operators		2
3. Image transformations (Fourier, Cosine, Sinus, etc.)		2
4. Image segmentation		2
5. Image compression		2
6. Mathematical morphology		2
7. Project defence		2

Bibliography
1. C. Grava, V. Buzuloiu,„*Elemente de prelucrarea şi analiza imaginilor*", Editura Universităţii Oradea, 2007
2. L.M. Ivanovici, „*Procesarea imaginilor*",Editura Universităţii Transilvania Braşov, 2003
3. C. Grava, C. Vertan, V. Buzuloiu, *Prelucrarea şi analiza imaginilor. Îndrumar de laborator*, Editura Universităţii din 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 is adapted to the requirements of some main employers of the students of this specialization. These requirements were synthesized following discussions with representatives of these employers, who work in the industrial park of Oradea.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Exam result and activity during the semester	Written exam (and oral, if applicable). The evaluation can be done face to face or online	70%
10.5 Academic seminar	-		
10.6 Laboratory	The result of the final evaluation and the activity during the semester	Evaluation - designing a practical application Practical test. The evaluation can be done face to face or online.	10% A percentage of 10% of the final grade from the laboratory is awarded for the activity during the semester.
10.7 Project	The result of the final evaluation and the activity during the semester	Evaluation - designing a practical application / project. The evaluation can be done face to face or online.	20% A percentage of 10% of the final grade from the project is awarded for the practical achievement and the activity during the semester.
10.8 Minimum performance standard: dealing with at least one theory topic, the application one and the correct answer to 2 eliminatory questions at the exam, respectively designing and implementing an elementary algorithm for image processing and analysis, laboratory and project development.			

Completion date:
15.09.2022

Signature of the course holder

prof. Cristian Grava
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https://prof.uoradea.ro/cgrava/

Signature of the laboratory holder

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Date of endorsement in the department:

19.09.2022

Signature Departament Directory
prof.dr.ing. Daniel Trip
dtrip@uoradea.ro
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Date of endorsement in the Faculty Board:
23.09.2022

Dean's Signature
prof.univ.dr.ing. Ioan – Mircea Gordan
mgordan@uoradea.ro
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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	**Electronics and Telecommunications**
1.4 Field of study	**Electronics Engineering, Telecommunications and Informational Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Engineer**

2. Data related to the subject

2.1 Name of the subject	Microcontrollers - Project						
2.2 Holder of the subject	Prof.univ.dr.ing. Trip Nistor Daniel						
2.3 Holder of the academic seminar/laboratory/**project**	Prof.univ.dr.ing. Trip Nistor Daniel						
2.4 Year of study	III	2.5 Semester	I	2.6 Type of the evaluation	Vp	2.7 Subject regime	O

(I) Imposed (O) Optional (F) Facultative

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 seminar/laboratory/project	-/-/**1**
3.4 Total of hours from the curriculum	**14**	of which: 3.5 course	-	3.6 seminar/laboratory/project	-/-/**14**
Distribution of time					11
Study using the manual, course support, references and handwritten notes					4
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					0
Tutorials					1
Examinations					2
Other activities					

3.7 Total hours for individual study	**11**
3.9 Total 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	-
5.2. for the development of the seminar/laboratory/project	-

6. Specific skills acquired

Professional skills	C3. Applying knowledge, concepts and basic methods of architecture of computing systems, microprocessors, microcontrollers, language and programming techniques.
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	Discipline aims to provide students with practical training in making a software application on a microcontroller development circuit or making an electronic small / medium complexity based on a microcontroller.
7.2 Specific objectives	It is intended to equip the mode of microcontrollers and their programming to serve different applications. Place emphasis on how to rally a microcontroller interface circuits.

8. Contents*

8.4 Proiect	Teaching methods	No. of hours/ Observations
Presentation of the main notions of use of microcontrollers. Preliminary concepts. Presentation of design stages and establishment of design themes.	Interactive presentation.	2
Implementation of a logical diagram of an application starting from the requirements and facilities offered by the chosen microcontroller.	Interactive presentation and projection with video projector.	2
Designing the electronic circuit of the application using a microcontroller.	Interactive presentation and projection with video projector.	2
Implementation of the circuit on a test plate or use of a development / test board. Implementation of the application algorithm.	Interactive presentation and projection with video projector.	2
Application programming and testing.	Interactive presentation and projection with video projector.	2
Getting started to design printed circuit boards for microcontrollers based circuits.	Interactive presentation and projection with video projector.	2
The mode of elaboration of the project and the presentation of its content.	Interactive presentation and projection with video projector.	2

References

1. N.D. Trip, Microcontrolerul PIC16F887. Aplicaţii. Editura Universităţii din Oradea, 2014.
2. G. Muscă, Programare în limbaj de asamblare. Editura Teora, Bucureşti, 1997.
3. C. Lupu, Ş. Stăncescu, Microprocesoare. Circuite. Proiectare. Editura Militară, Bucureşti, 1986.
4. xxx, Date de catalog, Microcontrolere – Firmele Texas Instruments, Microchip.
5. xxx, Aplicaţii, Microcontrolere – Firmele Texas Instruments, Microchip.

* The content, respectively, the number of hours allocated to each course / seminar / laboratory / project during the 14 weeks of each semester of the academic year.

9. Corroboration of contents of discipline with the expectations of representatives of the epistemic community, professional associations and representative employers in the field of the program

The content of the microcontroller discipline - the project fully meets the requirements of Electronic Engineering and Telecommunication Engineering, as it is currently much of their production is related to the production of microcontrollers-based circuits to be tested and programmed in the circuit for different types of equipment wide consumption, telecommunication, medical etc.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-	-	-
10.5 Seminar	-	-	-
10.6 Laboratory	-	-	-
10.7 Project	Active participation in project hours. Making the requirements, within term, for each stage of the project. A 10% of the note to the evaluation of the project activity will be to assess the results of the individual study.	Periodic check of the design stages and evaluating the results obtained. Supporting the project at the end of the semester.	30% - The activity from the project. 70% - Content of the project.
10.8 Minimum performance standard: Project - Knowledge for mark 7 - Designing the basic elements of a small / medium complexity circuit made with a microcontroller or making a software application to configure the internal resources of a microcontroller.			

Date of completion

Date of approval in department

Date of approval in Council of the faculty

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	**Electronics and Telecommunications**
1.4 Field of study	**Electronics Engineering, Telecommunications and Informational Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Engineer**

2. Data related to the subject

2.1 Name of the subject	Microcontrollers						
2.2 Holder of the subject	Prof.univ.dr.ing. Trip Nistor Daniel						
2.3 Holder of the academic seminar/**laboratory**/project	Prof.univ.dr.ing. Trip Nistor Daniel						
2.4 Year of study	III	2.5 Semester	I	2.6 Type of the evaluation	Vp	2.7 Subject regime	O

(I) Imposed (O) Optional (F) Facultative

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 seminar/laboratory/project	-/**2**/-
3.4 Total of hours from the curriculum	56	of which: 3.5 course	**28**	3.6 seminar/laboratory/project	-/**28**/-

Distribution of time	69
Study using the manual, course support, references and handwritten notes	25
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	20
Tutorials	2
Examinations	2
Other activities	

3.7 Total hours for individual study	**69**
3.9 Total 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	-
5.2. for the development of the seminar/laboratory/project	-

6. Specific skills acquired	
Professional skills	C2. Applying the basic methods for the aquisition and processing of signals C3. Applying knowledge, concepts and basic methods of architecture of computing systems, microprocessors, microcontrollers, language and programming techniques. C4. Design and use of hardware and software applications of reduced complexity specific to the applied electronics.

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 aims to contribute to the acquisition of basic knowledge: theoretical, practical and design, in the field of microcontrollers, focusing on the characteristics of these devices, on their way of operation and programming.
7.2 Specific objectives	Study of the functioning of microcontrollers and analyzing the development of their architecture, including the state -of -the -art. It is aimed at learning the programming of microcontrollers used in different applications. Ways to carry out interface circuits for microcontrollers with different specialized circuits are studied. At the laboratory hours, the way of programming the microcontrollers in the assembly and in high level language is studied, as well as the experimentation of practical applications based on the latest microcontrollers.

8. Contents*

8.1 Course / lecture	Teaching methods	No. of hours/ Observations
Presentation of the disciplinary sheet. Introduction. Generalities about microcontrollers. Justification of the appearance of microcontrollers. Evolution and use.	Interactive lecture. Video projector use.	2
Internal architecture of a microcontroller (risk). Functional units: the arithmetic and logical unit, the memory units, the control and control unit, the internal bus, special functions, input ports and specialized internal resources. Mode of operation.	Interactive lecture. Video projector use.	2
Representation of data in digital format for microcontrollers.	Interactive lecture. Video projector use.	2
The set of instructions. Configuring a microcontroller. Basic settings.	Interactive lecture. Video projector use.	2
Input - output ports of the microcontrollers and the modalities of setting and use. Electrical characteristics.	Interactive lecture. Video projector use.	2
The interruption system. Hardware and software interruptions.	Interactive lecture. Video projector use.	2
Timing circuits and serial ports.	Interactive lecture. Video projector use.	2
Digital analog converters and integrated PWM generators.	Interactive lecture. Video projector use.	2
Notions of design circuits based on microcontrollers.	Interactive lecture. Video projector use.	2
Programming microcontrollers in the assembly language.	Interactive lecture. Video projector use.	2
Programming microcontrollers in high level language.	Interactive lecture. Video projector use.	2
Specialized modules used in the development of applications based on microcontrollers (made by the course holder, Arduino, etc.)	Interactive lecture. Video projector use.	2
Application I - signaling circuit. Example of implementation.	Interactive lecture. Video projector use.	2
Application II. Example of implementation.	Interactive lecture. Video projector use.	2

Biography / References list

1. N.D. Trip, Microcontrolerul PIC16F887. Aplicaţii. Editura Universităţii din Oradea, 2014.
2. G. Muscă, Programare în limbaj de asamblare. Editura Teora, Bucureşti, 1997.

3. C. Lupu, Ş. Stăncescu, Microprocesoare. Circuite. Proiectare. Editura Militară, Bucureşti, 1986. 4. xxx, Date de catalog, Microcontrolere – Firmele Texas Instruments, Microchip.		
8.2 Seminar	Teaching methods	No. of hours/ Observations
	-	-
8.3 Laboratory		
Presentation of a programming environment for the development of microcontrollers based applications.	Interactive presentation	2
Presenting the method of programming in the circuit of a didactic module and carrying out the operations of troubleshooting the software application.	practical example	2
The set of instructions and microcontrollers programming.	experimentation	2
Numbering systems.	experimentation	2
I/O ports. I/O pins configuration.	experimentation	2
Interconnecting a keyboard at the microcontroller.	experimentation	2
Interconnecting a display at the microcontroller.	experimentation	2
Integrated analog to digital converter.	experimentation	2
Programming and use of the standard serial port.	experimentation	2
Timing circuit.	experimentation	2
PWM generator.	experimentation	2
Temperature measurement circuit with microcontroller.	experimentation	2
Serial port.	experimentation	2
Command of a GPRS modem.	experimentation	2

* The content, respectively, the number of hours allocated to each course / seminar / laboratory / project during the 14 weeks of each semester of the academic year.

9. Corroboration of contents of discipline with the expectations of representatives of the epistemic community, professional associations and representative employers in the field of the program

The content of the microcontrollers discipline fully responds to the requirements of employers in the field of electronic engineering and telecommunications, as at present, much of their production is related to the production of circuits based on microcontrollers to be tested and scheduled in the circuit, for different types of consumer equipment, telecommunications, medical etc.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Active involvement in course hours through communication, argumentation, ingenuity, on the topics subject to debate. Knowing the basic notions regarding all the topics addressed during the course hours.	Oral or writing evaluation.	60%
10.5 Seminar		-	-
10.6 Laboratory	Realization of the requirements indicated in the laboratory works. Crossing the bibliography. A percentage of 10 % of the final note from the laboratory, is granted for the successful completion of the individual study topic.	Practical and written tests to verify the training of students for the laboratory activity; Checking the correctness of the results obtained by experimental / simulation.	40%
10.7 Project		-	-
10.8 Minimum performance standard: Course - knowledge for note 5 - minimum knowledge regarding the			

architecture of microcontrollers, setting the integrated dedicated resources and making a logical diagram of small / average complexity for a concrete application based on microcontrollers. Laboratory - knowledge for note 5 - performing all laboratory applications provided in the discipline sheet; Implementation of a program in assembly language containing elements of configuration of the respective microcontroller use its integrated resources.

Data completării

Data avizării în departament

Data avizării în Consiliul Facultăţii

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Microwaves**				
2.2 Holder of the subject			Moldovan Liviu				
2.3 Holder of the academic seminar/laboratory/project			Moldovan Liviu				
2.4 Year of study	III	2.5 Semester	6	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	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	28
Distribution of time					74 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					7
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	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	projector
5.2.for the development of the academic	The students will have access to the didactic materials necessary for the development in optimal conditions of the works provided in the syllabus.

seminary/laboratory/project	

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Analyzing low-average complexity electronic circuits and systems, in order to design and measure them. - Troubleshooting and repairing certain electronic circuits, equipment and systems. - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. - Designing and implementing electronic circuits of low/average complexity using CAD_CAM technologies, as well as the standards applied in the domain. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. - The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - Evaluation, based on technical criteria and standards relating to environmental impact, of equipment from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - Designing, using consecrated principles and methods, of low complexity systems from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Explaining and interpreting production processes and maintenance activities for the electronic equipment, identifying the points for testing and the electrical measurements to be determined. - Applying the principles of management for the organization, from the technological point of view, of production, exploitation and service activities in the fields of applied electronics. - Using criteria and methods for the evaluation of quality in different production and service activities in the fields of applied electronics. - Designing the technology for the fabrication and maintenance (by pointing out at necessary components and operations) of some limited and average-complexity products in the fields of applied electronics.
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	▪ Familiarization of students with the propagation of electromagnetic waves in the waveguide, in the transmission line, as well as with the basic elements and microwave circuits.
7.2 Specific objectives	▪ Students to be able to design linear microwave circuits, to know the principles and how to operate electronic microwave tubes, to know the principles and how to operate microwave applications in electronics.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction	Transmission of knowledge using oral communication, presentation, conversation, problematization (using video and power point materials), written communication (bibliographies).	2
2. Main theoretical aspects of electromagnetism. Maxwell's equations Classification of electromagnetic waves.		2
3. Wave–particle duality. Flat electromagnetic waves. Electromagnetic waves directed between conductive surfaces		2
4. Microwave Engineering Modes of Propagation. Waveguides modes. Wavelength and the Wave Impedance		2
5. Transverse Electromagnetic Wave. Transverse Electric Wave. Transverse Magnetic Wave. Hybrid Wave		2
6. Multi-conductor Lines. Co-axial Lines. Strip Lines. Micro Strip Lines. Other Lines.		2
7. Electromagnetic Waveguides. Transmission Lines Vs Waveguides.		2
8. Smith chart.		2
9. Reflex Klystron. Construction of Reflex Klystron. Operation of Reflex Klystron. Applications of Reflex Klystron		2
10. Travelling Wave Tube. Construction of Travelling Wave Tube. Operation of Travelling Wave Tube. Applications of Travelling Wave Tube.		2
11. Magnetrons. Cavity Magnetron. Construction of Cavity Magnetron. Operation of Cavity Magnetron with Active RF Field.		2
12. Microwave Amplifiers (stability of microwave transistor amplifiers, power amplification, amplifier noise, microwave transistor polarization aspects, semiconductor microwave amplifiers). Microwave oscillators.		2
13. Antennas and propagation of electromagnetic waves.		2
14. Recap		2

Bibliography

1. L. Moldovan, Note de curs, format electronic, http://webhost.uoradea.ro/liviu/
2. P. Ferrari, Phénomènes de propagation en radiofréquences, curs, Universitatea din Grenoble, 2012
3. Rulea George; Tehnica microundelor ,E.D.P. Bucureşti, 1981.
4. Naforniţă Ioan; Tehnica microundelor vol.I şi II. , I. P. Traian Vuia Timişoara,1982
5. David M. Pozar , Microwave Engineering, Wiley & sons, 2005
6. L. Bucăţică, G. Nicolae, G. Pricop, Tehnica frecvenţelor înalte, vol. II, Brasov, 2010
7. George Lojewski, „Dispozitive şi circuite de microunde", Ed. Tehnică, Bucureşti 2005.
8. George Lojewski, N.Militaru, „Microunde, Culegere de probleme", Ed.Electronica2000, Bucureşti 2005.
9. D.D. Sandu, „Microunde", Ed. Victor, Bucureşti, 2005

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Using a microwave propagation simulation tool (MEFIsTo– 2D)	Method based on direct and indirect action, simulated action, the student's role being an active one	2
2. Study of the magnetron and the microwave oven		2
3. The study of the reflex clistron		2
4. Transmission lines		2
5. Study of coaxial cables		2
6. Study of TEM wave propagation on transmission lines		2
7. Study of waves propagation in rectangular waveguides		2
8. Study of waveguides		2
9. Study of higher propagation modes in rectangular waveguides		2
10. Study of microstrip lines and their use in microwave circuits		2
11. Using the Smith chart		2
12. Measurement of microwave power by calorimetric method		2
13. Emitting a signal using a horn antenna and its detection		2

14. Laboratory work not performed at time		2

Bibliography

1. I. Gavrluţ, D. Albu, Microunde – Îndrumător de laborator, Editura Universitatii din Oradea, 2002
2. User manual Mefisto-2D, Faustus Scientific Corporation, 2012
3. Note de laborator, http://webhost.uoradea.ro/liviu/

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 acquired skills will be necessary for the employees who will carry out their activity in the companies with specific activities.

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): Knowledge of the operating principles of microwave circuits and devices - For 10: Answers to specific questions in the subject matter, description of the operation of a microwave device or circuit.	Writing (2 hours), followed by discussion if necessary. If face-to-face exam is impossible, an oral examination using Microsoft Teams will be done.	70%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): Active participation in laboratory's activities For 10: Answers to specific questions in the laboratory's activities	50% for the successful completion of the individual study topic 50% for answers to questions during the activities.	30%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the phenomena that occur in an electronic circuit when high frequencies of signals are used. Knowledge of the operating principles of microwave devices and circuits and their usefulness. Laboratory: - Carrying out all practical work Project:			

Completion date: 16.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**Nano and micro technologies for electronics - Project**			
2.2 Holder of the subject				Moldovan Liviu			
2.3 Holder of the academic seminar/laboratory/project				Moldovan Liviu			
2.4 Year of study	III	2.5 Semester	5	2.6 Type of the evaluation	CA (Vp)	2.7 Subject regime	SD

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	0/0/1
3.4 Total of hours from the curriculum	14	Of which: 3.5 course		3.6 academic seminar/laboratory/project	14
Distribution of time					12
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					5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					5
Tutorials					-
Examinations					1
Other activities.					-

3.7 Total of hours for individual study	**12**
3.9 Total of hours per semester	**26**
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	projector
5.2.for the development of the academic seminary/laboratory/project	The students will have access to the didactic materials necessary for the development in optimal conditions of the works provided in the syllabus.

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. - The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software.
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	▪ Familiarizing of students with the nano and micro electronic devices design.
7.2 Specific objectives	▪ Designing the steps for making a nano or microelectronic device.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
8.2 Academic project	Teaching methods	No. of hours/ Observations
1. The stages of carrying out a project in the field of nano and micro technologies.	exposure	2
2. The stages of carrying out a project in the field of nano and micro technologies.	exposure	2
3. The stages of a concrete project theme.	exposure/ discussions	2
4. Making a proposal of successions of technological processes.	discusions/ problematizations	2
5. Determining alternative methods for carrying out the project.	discusions/ problematizations	2
6. Argumentation of the chosen method according to advantages and disadvantages.	discusions/ problematizations	2
7. Project defending		2

Bibliography

1. N.P. Mahalik - Micromanufacturing and Nanotechnology, Springer, 2006 - link
2. L. Moldovan, Note de curs – Nano şi Microtehnologii electronice, format electronic, http://webhost.uoradea.ro/liviu/
3. Olivier Bonnaud - Curs de iniţiere în microelectronică - link
4. A.k. Haghi (editor) - Research Progress in Nanoscience and Nanotechnology, Gazelle Distribution, 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 acquired skills will be necessary for the employees who will carry out their activity in the local electronics industry in the field of electronic equipment production.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-		
10.5 Academic seminar	-		
10.6 Laboratory	-		
10.7 Project	Feasibility of the realized project	Project analysis	80%
	Understanding the problems to be avoided	Discussions on the project	20%
10.8 Minimum performance standard: Course: Academic seminar: Laboratory: Project: The correct use of the technological processes studied in the course.			

Completion date: 16.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**Nano and micro technologies for electronics**			
2.2 Holder of the subject				Moldovan Liviu			
2.3 Holder of the academic seminar/laboratory/project				Moldovan Liviu			
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	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	62 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	14
Tutorials	7
Examinations	3
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	projector
5.2.for the development of the academic	The students will have access to the didactic materials necessary for the development in optimal conditions of the works provided in the syllabus.

seminary/laboratory/project	

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Analyzing low-average complexity electronic circuits and systems, in order to design and measure them. - Troubleshooting and repairing certain electronic circuits, equipment and systems. - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. - Designing and implementing electronic circuits of low/average complexity using CAD_CAM technologies, as well as the standards applied in the domain. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Explaining and interpreting production processes and maintenance activities for the electronic equipment, identifying the points for testing and the electrical measurements to be determined. - Applying the principles of management for the organization, from the technological point of view, of production, exploitation and service activities in the fields of applied electronics. - Using criteria and methods for the evaluation of quality in different production and service activities in the fields of applied electronics. - Designing the technology for the fabrication and maintenance (by pointing out at necessary components and operations) of some limited and average-complexity products in the fields of applied electronics.
Transversal skills	**CT3. Adaptation to the new technologies, professional and personal development by means of continuous education formation, using printed documents, specialized software and electronic resources both in Romanian and at least in one international foreign language.**

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

7.1 The general objective of the subject	▪ Familiarizing of students with the nanotechnologies used in the electronics industry and in specialized research laboratories.
7.2 Specific objectives	▪ Defining all the stages necessary to carry out a research project and gaining by students the skills needed in research activities in the field of nanotechnologies.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction	Transmission of knowledge using oral communication, presentation, conversation, problematization (using video and power point materials), written communication (bibliographies).	2
2. Silicon. Physical and chemical properties. Manufacture of silicon wafers		2
3. Silicon wafers cleaning techniques. Good cleanroom practices		2
4. Photolithography (what it is, what it uses, what are the properties of the photosensitive resin, how to obtain different cross section profiles)		2
5. Electronic lithography (what it is, how it is used, how to use electronic scanning microscope in electronic lithography, what are the properties of PMMA, what are the advantages and disadvantages of photolithography)		2
6. Dry etching (what is plasma, principles of plasma etching, choice of gases depending by the material to be etched)		2
7. Wet etching (how to use acids and bases for wet etching, wet etching principles, choice of acids or bases depending by the material to be etched)		2
8. Oxidation (physical and chemical phenomena occurred in the oxidation process, types of oxidation, conditions necessary to use oxidation during a technological process)		2
9. Semiconductors doping (physical and chemical phenomena involved in the doping process, types of oxidation, conditions necessary to use oxidation during a technological process)		2
10. Vapors deposition and chemical deposition (evaporator operating principle, conditions for choice of vaporization or chemical deposition,		2

commonly used materials)		
11. Molecular beam epitaxy (principle of epitaxial growth, functioning of devices necessary for epitaxial growth, measures to prevent contamination with impurities, techniques for a suitable vacuum)		2
12. Geometric characterization techniques (Profile characterization using dektak, electron microscopy and ellipsometry measurements)		2
13. Electrical characterization techniques (four point method)		2
14. Nano-Impression Techniques		2
Bibliography 1. L. Moldovan, Note de curs – Nanotehnologii electronice, format electronic, http://webhost.uoradea.ro/liviu/ 2. Olivier Bonnaud - Curs de iniţiere în microelectronică - link 3. Baird, D.; Nordmann, A. & Schummer, J. (editori) - Discovering the Nanoscale, Amsterdam: IOS Press, 2004 4. W. R. Fahrner (editor) - Nanotechnology And Nanoelectronics: Materials, Devices, Measurement Techniques, Springer, 2005 - link 5. N.P. Mahalik - Micromanufacturing and Nanotechnology, Springer, 2006 - link 6. A.k. Haghi (editor) - Research Progress in Nanoscience and Nanotechnology, Gazelle Distribution, 2012 7. Sandro Carrara - Bio/CMOS Interfaces and Co-Design, Springer, 2012		
8.2 Academic seminar	Teaching methods	No. of hours/ Observations
1. Calibration of depositions by spin coating - calculation / determination of optimal parameters (spin speed, acceleration, time, drying temperature).	Problematization, debate, realization of mini-projects.	2
2. Metallization / Evaporation of layers - Calculation / determination of optimal parameters (time, temperature).		2
3. Electronic lithography - realization of patterns, determination of optimal parameters.		2
4. Etching - determining the optimal parameters.		2
5. Doping - calculation of distributions, concentrations and depths.		2
6. Electrical characterization of thin surfaces using the four-point method.		2
7. Characterization of wafers using an atomic force microscope		2
Bibliography 1. Baird, D.; Nordmann, A. & Schummer, J. (editori) - Discovering the Nanoscale, Amsterdam: IOS Press, 2004 2. W. R. Fahrner (editor) - Nanotechnology And Nanoelectronics: Materials, Devices, Measurement Techniques, Springer, 2005 - link 3. N.P. Mahalik - Micromanufacturing and Nanotechnology, Springer, 2006 - link		

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 acquired skills will be necessary for the employees who will carry out their activity in the local electronics industry in the field of electronic equipment 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: the establishment in chronological order of the technological processes for a given structure and the illustration of the evolution of the tranche towards the desired structure. - For 10: Answers	Writing (2 hours), followed by discussion if necessary. If face-to-face exam is impossible, an oral examination using Microsoft Teams will be done.	80%

	to specific questions regarding the technological processes, the description of a technological process, the establishment in chronological order of the technological processes for a given structure and the illustration of the evolution of the tranche towards the desired structure.		
10.5 Academic seminar	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: knowledge of measurable parameters following each technological process. - For 10: knowledge of the measurable parameters following each technological process and how they are determined.	50% for the successful completion of the individual study topic 50% for answers to questions during the activities.	20%
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Course: Knowing the definitions of all presented technological processes, and knowing comparing them when necessary. Knowing the criteria for choosing a certain technological process. Academic seminar: Knowing the methods for determining of the measurable parameters of the electronics nanostructures. Laboratory: Project:-			

Completion date: 16.09.2022

Date of endorsement in the department: 19.09.2022

Date of endorsement in the Faculty Board: 23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Electronics and Telecommunications
1.4 Field of study	Electronical Engineering, Telecommunications and Information Technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Reliability					
2.2 Holder of the subject		As. Prof. PhD eng. **Novac Ovidiu-Constantin**					
2.3 Holder of the academic seminar/laboratory/project							
2.4 Year of study	III	2.5 Semester	6	2.6 Type of the evaluation	VP - Continuous Assessment	2.7 Subject regime	SD

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

3.1 Number of hours per week	2	of which: 3.2 course	2	3.3 academic seminar/laboratory	---
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	28	3.6 academic seminar/laboratory	---
Distribution of time					22 hours
Study using the manual, course support, bibliography and handwritten notes					8
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					2
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					8
Tutorials					-
Examinations					4
Other activities.					-
3.7 Total of hours for individual study	**22**				
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	-
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	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. **C6. Solving technological problems in the fields of applied electronics:**. - Designing the technology for the fabrication and maintenance (by pointing out at necessary components and operations) of some limited and average-complexity products in the fields of applied electronics
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 main purpose of the course is to present notions and methods for evaluating the reliability of computer systems and complex electronic systems, both in the design phase and in the testing and operation. This discipline is addressed to system designers, researchers and is useful to future engineers who in the design phase of a product must take into account the aspects of reliability.
7.2 Specific objectives	After completing the discipline "Reliability", students acquire the following skills: • Knowledge and proper use of specific notions of reliability; • Knowledge of reliability indicators: reliability, maintainability, and availability. • Calculation of reliability indicators using reliability block schemes, • Calculation of reliability indicators using Markov chains in discrete time or in continuous time. After completing the discipline "Reliability", 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
1. Introduction	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
2. Fundamentals of reliability. Reliability parameters. Equipment wear modeling	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
3. Fundamentals of reliability. Maintainability. Maintenance. Availability.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
4. Fundamentals of reliability. Distribution laws	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2

5. Reliability models. The functional model. The logical model. Markov models and reliability block diagram. Matrix formulation of the Markov model	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
6. Reliability models. Applications to composite systems. Fault shaft model	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
7. Fault tolerant equipment. Introduction. Fault detection and diagnosis algorithms	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
8. Fault tolerant equipment. Redundant structures for implementing fault tolerance	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
9. Techniques for improving reliability and availability. Methods for generating test sequences used in fault diagnosis. Test methods.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
10. Techniques to improve reliability and availability. Self-checking equipment. Methods to ensure easy testability.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
11 Techniques for improving reliability and availability. Specific problems of fault tolerance implementation techniques. Equipment reconfiguration techniques in the event of failures.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
12. Reliability of electronic devices and computer systems. Introduction. Design of electronic devices and computer systems.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
13. Reliability of electronic devices and computer systems. Reliability of programs.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
14. Reliability tests	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
Bibliography 1. Mircea Vlăduţiu, "Tehnologie de ramură şi fibilitate (curs)", I.P. "Traian Vuia " Timişoara, 1982. 2. Vari K. Ştefan, "Fiabilitatea sistemelor de calcul (curs)", Universitatea din Oradea, 1998. 3. Cătuneanu, V., et co., "Structuri electronice de înaltă fiabilitate", Ed. Militară, 1989, 4. Abramovici, M., Breuer, M., Friedman, A., "Digital System Testing and Testable Design ", Computer Science press, 1990, 5. Vari K. Ştefan, "Evaluarea fiabilităţii sistemelor de calcul", Editura Universităţii din Oradea, 2002. 6. Ovidiu Novac - „Fiabilitatea sistemelor electronice”, Editura Universităţii din Oradea, ISBN 978-973-759-985-8, 2009.		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
8.3 Seminar	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 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 reliability Written exam.	Continuous Assessment, computer applications / Online assessment (Online questionnaire)	100 %
10.5 Seminar			
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Knowledge of the basic notions of the treated subject and its interconnections in a percentage of at least 50% for grade 5. Knowledge of the basic notions, meanings, analytical relations and solving the problem that calculates the reliability indicators, in percentage of 100%, for grade 10 (highest grade).			

Completion date:
01.09.2022

Date of endorsement in the department:
21.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics **/** Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Television**						
2.2 Holder of the subject	**Lect.dr.eng. Gavriluţ Ioan**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.dr.eng. Gavriluţ Ioan**						
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 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	44
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	10
Tutorials	-
Examinations	4
Other activities.	-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	The classroom. The course can be held face to face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using specific methods and instruments for signal analysis. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods.
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 with the main problems of capture, transmission and reproduction on television. It presents the general characteristics of television systems, the specific problems of color television, types of transmission of image and sound information. The laboratory works consider the deepening and completion of the theoretical knowledge by getting acquainted with the defect simulation stand Lucas Nulle and by using LED TV for measurements and practical applications
7.2 Specific objectives	- Acquiring specific problems in television: capture, transmission and reproduction; - Understanding the general characteristics of television systems: types of transmission of image and sound information; - Knowledge of the specific problems of color television; - Understanding the general principles regarding LCD and LED screens;

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations

Television systems. The TV principle	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	2
Interwoven linear exploration		2
The complex video signal		2
Characteristics of the video signal in the frequency domain (TV system resolution, frequency spectrum structure of the video signal)		2
Transmission of color information on television. The structure of a compatible color TV system		2
PAL color TV system (quadrature amplitude modulation, chrominance information encoding, PAL color complex video signal, PAL encoder and decoder)		4
Integrated video capture devices		2
Television image reproduction devices		4
Transmission channels used in television (broadcast television, cable TV broadcasting, satellite TV broadcasting)		2
Analog-digital television systems		2
Digital transmission of television signals: DVB-T system, DVB-S system, DVB-C system		4
Bibliography		
Gh. Mitrofan, G. Pflanzer, *Iniţiere în televiziunea în culori*, Editura Tehnică, Bucureşti, 1983		
E. Damachi, C. Şerbu, R. Zaciu, *Televiziune*, Editura Didactică si Pedagogică, Bucureşti, 1983		
R.M. Bârsan, *Dispozitive şi circuite integrate cu transfer de sarcină*, Editura Tehnică, Bucureşti, 1981		
Gh. Mitrofan, *Televiziune digitală*, Editura Academiei, Bucureşti, 1986		
A. Gacsádi, *Bazele televiziunii*, Editura Universităţii din Oradea, Oradea, 2002		
A. Gacsádi, I. Gavriluţ, *Bazele televiziunii - îndrumător de laborator*, Editura Universităţii din Oradea, Oradea 2008		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of laboratory works.	Using the laboratory guide, presenting the paper, performing the measurements, performing the related calculations, completing the tables of results and making graphs The activity can also be carried out online	2
Color scheme of the color TV receiver		2
Complex video television signal		2
Intermediate frequency amplifier		2
Channel selector		2
The sound path from the TV receiver		2
PAL decoder		2
The LCD screen		2
The LED screen		2
T-CON module		2
CCFL inverter		2
LED inverter		2
The command microprocessor		2
Laboratory recoveries		2
Bibliography		
A. Gacsádi, *Bazele televiziunii*, Editura Universităţii din Oradea, Oradea, 2002		
A. Gacsádi, I. Gavriluţ, *Bazele televiziunii - îndrumător de laborator*, Editura Universităţii din Oradea, Oradea 2008		

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 those taught at other universities in the country and abroad. The meetings of the university teachers with representatives of the professional associations and of	

the employers led to the adaptation of the analytical program to the specific requirements of the labor market. Also, the content of the analytical program of the discipline was debated with ARACIS members in various stages of the controls carried out.	

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The level and quality of student training in the course.	written test or quizzes in the case of online assessment	70%
10.5 Academic seminar			
10.6 Laboratory	Assimilation of theoretical and practical knowledge following individual study and laboratory work.	Verification of the accumulation of knowledge and the ability to use practical applications.	30%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the main problems of capture, transmission and reproduction in television Laboratory: Carrying out the laboratory applications provided in the subject description			

Completion date:
15.09.2022

Lect.dr.eng. Gavriluţ Ioan
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Date of endorsement in the department:
19.09.2022

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Date of endorsement in the Faculty Board:
23.09.2022

Dean,
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Pagina web: http://mgordan.webhost.uoradea.ro/

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
1.4 Field of study	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		Automata system design					
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	Speciality 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	11
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	4
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	- 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 facility has to be provided with the necessary equipments - Students presence to all laboratory 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 workst leads to the restoration of the subject - The laboratory hours can be carried out face to face or online
6. Specific skills acquired	
Professional skills	C2. Applying basic methods for the acquisition and processing of signals. C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics. C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility.
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	▪ To create the necessary skills for the design and using of control systems with programmable logic controllers
7.2 Specific objectives	▪ Familiarizing students with the structure of programmable logic controllers ▪ Acquiring basic knowledge about programming languages, internal bit memories, timers and counters, programming methods ▪ Highlighting the peculiarities of analog interface and communication in distributed systems ▪ Acquisition of necessary skills for dealing with human-machine interfaces and practical aspects

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	2 hours
2. The structure of the PLCs	face to face or online interactive presentation	4 hours
3. Programming languages	face to face or online interactive presentation	4 hours
4. Special functions	face to face or online interactive presentation	4 hours
5. Programming techniques	face to face or online interactive presentation	4 hours
6. Analog signals and close loop control	face to face or online interactive presentation	2 hours
7. Distributed systems	face to face or	2 hours

	online interactive presentation	
8. Human - machine interface	face to face or online interactive presentation	4 hours
9. Practical aspects	face to face or online interactive presentation	2 hours
Bibliography 1. E. Gergely, Proiectarea sistemelor automate, curs în format electronic, 2021. 2. E. Gergely, Helga Silaghi, V. Spoială, L. Coroiu, Z. Nagy, Automate programabile. Operare, programare, aplicaţii, Editura Universităţii din Oradea, Oradea, ISBN 978-973-759-940-7, 2009. 3. 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. The PLC instruction set	Laboratory work summary and practical demonstrations using specific equipments	2 hours
3. Base racks and discrete I/O modules	Laboratory work summary and practical demonstrations using specific equipments	2 hours
4. Timers and counters	Laboratory work summary and practical demonstrations using specific equipments	2 hours
5. Analog input modules	Laboratory work summary and practical demonstrations using specific equipments	2 hours
6. Analog output modules	Laboratory work summary and practical demonstrations using specific equipments	2 hours
7. PLC stage programming. Completion of the laboratories situation	Laboratory work summary and practical demonstrations using specific equipments	2 hours

Bibliography
1. E. Gergely, Proiectarea sistemelor automate, lucrări de laborator în format electronic, 2021.
2. Gergely E.I., Automate programabile. Aplicatii, 92 pag., Editura Universitatii din Oradea, CD-ROM EDITION ISBN: 978-606-10-1474-3, 2014
3. Gavriş M., Gergely E.I., Conducerea proceselor cu automate programabile, Editura Mediamira Cluj-Napoca, 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 subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be made face to face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For mark 10: - thorough knowledge regarding the architecture of the PLCs - thorough knowledge regarding the execution of PLC programs - thorough knowledge regarding the PLC programming languages - thorough knowledge regarding the PLC programming techniques	Written examination	66,66%
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	Knowledge assessment test	33,33%

	regarding the programming of the TI305 PLC -		

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

Completion date:
01.09.2022

Date of endorsement in the department:
12.09.2022

Date of endorsement in the department:
19.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Computer Vision**					
2.2 Holder of the subject		Prof. Cristian Grava					
2.3 Holder of the academic seminar/laboratory/project		Prof. Cristian Grava					
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 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 (in hours)					58
Study using the manual, course support, bibliography and handwritten notes					24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					6
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	Signals and systems, Information transmission theory, Image processing and analysis, Numerical signal processing, Television basics, Computer programming and programming languages
4.2 related to skills	C2

5. Conditions (where applicable)

5.1. for the process of the course	Equipped with video projector or Teams application. The course can be held face-to-face or online.
5.2.for the process of the seminary/laboratory/project	Computer equipment, Matlab or Octave software and / or Teams application. The laboratory can be carried out face to face or online.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation.

Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics.

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

7.1 The general objective of the subject	The general objective of this discipline is to familiarize students with the specific concepts of artificial vision: Human vision. The structure of the eye. Visual acuity, Notions of color physics, Linear and nonlinear color spaces, Color image model, Geometric models of a camera, Elementary artificial vision in still images, Elementary artificial vision in image sequences.
7.2 Specific objectives	The specific objectives of this discipline are to develop knowledge about the human visual system and how people perceive the environment and students' abilities to implement algorithms that partially reproduce the way people perceive colors and shapes.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Human vision. The structure of the eye. Visual acuity	Lecture + interactive methods	2
2. Image acquisition systems: CCD cameras, sensor models		2
3. Notions of color physics: • Light sources • Human perception of color • Color matching		5
4. Linear color spaces: • General characteristics. RGB space • XYZ, CMY and black, YUV, YCC color spaces		4
5. Nonlinear color spaces		2
6. Color image model		1
7. Geometric models of a camera • Homogeneous coordinate systems • Rigid transformations • Geometric parameters of a room		4
8. Elementary artificial vision in still images: • Linear filters • Convolution • Sampling • Contour detection		2
9. Elementary artificial vision in image sequences: • Geometry of multiple vision • Stereo view • Motion in image sequences		6

Bibliography

1. L. G. Shapiro, G. C. Stockman - "Computer Vision", Prentice Hall, 2001
2. C. Grava – „Vedere artificială şi realitate virtuală", Editura Universităţii din Oradea, 2008
3. D. Popescu – „Vedere artificială în aplicaţii industriale", Editura Electra, ISBN 973-7728-68-8, 2006
4. S.M. Grigorescu – „Sisteme de vedere artificială", Editura Universităţii Transilvania din Braşov, 2018
5. M. Hassaballah, A.I. Awad – „Deep Learning in Computer Vision. Principles and Applications", CRC Press, ISBN 9781138544420, 2020
6. C.H. Chen – „Handbook of Patern Recognition and Computer Vision", World Scientific, ISBN 978-9814656528, 2016
7. J. Janai, F. Guney, A. Behl, A. Geiger – „Computer vision for Autonomous vehicles: Problems, Datasets and State

of the Art", Foundation and Trends in Computer Graphics and Vision, http://dx.doi.org/10.1561/0600000079, 2020
8. M. Elgendy – „Deep Learning for Vision Systems", Manning Publications, ISBN 9781617296192, 2020
9. S. Kanimozhi Suguna, M. Dhivya, Sara – „Artificial Inteligence (AI). Computer Vision Concepts and Applications", ISBN 9781003005629, 2021

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introductory notions of artificial vision. Introduction to MATLAB	Practical works for simulation and development of application programs, debates on the problems encountered and methods for solving them	2
2. Convolution product. Resize images		2
3. Color spaces		2
4. Recover the rotation angle and scaling factor of an image		2
5. Objects Identification using templates		2
6. Text detection and recognition		2
7. Recovery of laboratory works		2

Bibliography:

1. C. Grava, C. Vertan, V. Buzuloiu, *Prelucrarea şi analiza imaginilor. Îndrumar de laborator*, Editura Universităţii din Oradea, 2003
2. C. Grava – „*Vedere artificială şi realitate virtuală*", Editura Universităţii din Oradea, 2008
3. R. Albu, C. Grava, *Vedere Artificială. Aplicaţii*, Editura Universităţii din Oradea, ISBN 978-606-10-1727-0, 68 p, 2016
M. Hassaballah, A.I. Awad – „Deep Learning in Computer Vision. Principles and Applications", CRC Press, ISBN 9781138544420, 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 is adapted to the requirements of some potential main employers of the students of this specialization. Together with disciplines such as "Shape Recognition" or "Image Processing and Analysis" it responds to practical applications that can be applied in the production process of most electronic component manufacturers in the industrial park of Oradea.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Exam result and activity during the semester	The result of the exam and the written exam (and oral, if applicable). The assessment can be done face to face or online. Activity during the semester	70%
10.5 Academic seminar	-		
10.6 Laboratory	The result of the final evaluation and the activity during the semester	Evaluation - designing a practical application. The evaluation can be done face to face or online.	30% A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic and for the activity during the semester.
10.7 Project			
10.8 Minimum performance standard: treating at least one theory subject and the correct answer to 2 eliminatory questions at the exam, respectively designing and implementing an imposed algorithm at the laboratory.			

Completion date:
15.09.2022

Date of endorsement in the department:

19.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

Signature of the course holder

prof. Cristian Grava
cgrava@uoradea.ro
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Signature of the laboratory holder

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Dean's Signature

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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	**Electronics and Telecommunications**
1.4 Field of study	**Electronics Engineering, Telecommunications and Informational Technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Engineer**

2. Data related to the subject

2.1 Name of the subject		Digital Signal Processors					
2.2 Holder of the subject		Prof.univ.dr.ing. Trip Nistor Daniel					
2.3 Holder of the academic seminar/laboratory/project		Prof.univ.dr.ing. Trip Nistor Daniel					
2.4 Year of study	IV	2.5 Semester	VII	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

(I) Imposed (O) Optional (F) Facultative

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 seminar/laboratory/project	-/1/-
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 seminar/laboratory/project	-/14/-
Distribution of time					58
Study using the manual, course support, references and handwritten notes					30
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					2
Other activities					

3.7 Total hours for individual study	**58**
3.9 Total 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 seminar/laboratory/project	-

6. Specific skills acquired	
Professional skills	C2. Applying basic methods for signal purchase and processing. C3. Applying knowledge, concepts and basic methods of architecture of computing systems, microprocessors, microcontrollers, language and programming techniques. C4. Designing and using reduced hardware and software applications specific to applied electronics.
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	Discipline aims to contribute to the acquisition of basic knowledge: theoretical, practical and design, in the field of numerical signal processors. Emphasis is placed on how to operate the signal processors on the implementation of algorithms using high levels / assembly languages.
7.2 Specific objectives	It is aimed at acquiring the mode of operation and programming applications for numerical signal processors used in various applications with emphasis on deployment of digital filters.

8. Contents*

8.1 **Course** (on site/ on-line)	Teaching methods	No. of hours/ Observations
Generalities about digital signal processors. Harvard architecture.	Interactive lecture. Presentation with video projector.	2
Representation of data in numerical signal processors.	Interactive lecture. Presentation with video projector.	2
State-of-the-art families of fixed and mobile point digital signal processors. General and specific features.	Interactive lecture. Presentation with video projector.	2
Configuring and addressing memory.	Interactive lecture. Presentation with video projector.	2
Arithmetic and logical unit.	Interactive lecture. Presentation with video projector.	2
"Pipe line" work technique of DSP.	Interactive lecture. Presentation with video projector.	2
Instructions and instruction blocks that are repeated.	Interactive lecture. Presentation with video projector.	2
Status and control registers. The interrupt system.	Interactive lecture. Presentation with video projector.	2
I / O ports. Pins for general use. Timing circuits. Serial communication ports.	Interactive lecture. Presentation with video projector.	2
Using ADC and PWM modules in signal processors.	Interactive lecture.	2

	Presentation with video projector.	
General notions on the implementation of signal processing specific algorithms.	Interactive lecture. Presentation with video projector.	2
Implementation of FIR numerical filters	Interactive lecture. Presentation with video projector.	2
Implementation of IIR numerical filters	Interactive lecture. Presentation with video projector.	2
Implement a PWM control circuit with the help of a digital signal processor.	Interactive lecture. Presentation with video projector.	2

References

1. N.D. Trip, S. Curilă, Procesoare digitale de semnal, Editura Universităţii din Oradea, 2000.
2. N.D. Trip, Procesorul digital de semnal TMS320C50, Editura Universităţii din Oradea, 2004.
3. A. Budura, Structuri numerice de prelucrare, Timişoara, 1996.
4. I. Iacovliev, Structuri numerice de prelucrare, Timişoara, 1995.
5. R. Arsinte, ş.a., Procesoare digitale de semnal. Generaţia TMS320C2x. Prezentare şi aplicaţii. Cluj, 1992.
6. *****,** TMS320C5x DSP Starter Kit - User's guide, Texas Instruments, 1994.
7. ***, TMS320C5505 Fixed-Point Digital Signal Processor datasheet (Rev. F), Texas Instruments Inc., sept. 2013.
8. ***, TMS320F2805x Piccolo ™ Microcontrollers, Texas Instruments Inc., iulie 2014.

8.2 Seminar	Teaching methods	No. of hours/ Observations
	Not necessary	-
8.3 Laboratory	Teaching methods	No. of hours/ Observations
Presentation of a programming environment for the development of applications based on numerical signal processors (i.e. CCS).	Presentation	2
Set of instructions and programming elements of the numerical signal processor.	Simulation and experimentation.	2
Initializing the numerical signal processor.	Simulation and experimentation.	2
Addressing the operands. Arithmetic and logical instructions.	Simulation and experimentation.	2
Implementation of a FIR digital filter.	Simulation and experimentation.	2
Implementation of a IIR digital filter.	Simulation and experimentation.	2
Implementation of a PWM comand circuit.	Simulation and experimentation.	2
8.4 Project		

* The content, respectively, the number of hours allocated to each course / seminar / laboratory / project during the 14 weeks of each semester of the academic year.

9. Corroboration of contents of discipline with the expectations of representatives of the epistemic community, professional associations and representative employers in the field of the program

The content of the discipline Numerical Signal Processors is fully responsible for Electronic Engineering and Telecommunication Employers, as it is currently much of their production is related to the production of circuits based on numerical signal processors, which must be tested and scheduled in the circuit for Different types of consumer equipment, telecommunication, medical etc.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Active involvement in classes through communication, argumentation, ingenuity, on the topics subject to debate. Knowledge of the basic notions of all topics approached during classes.	Oral or writing evaluation.	60%
10.5 Seminar		Not necessary.	-
10.6 Laboratory	Making the requirements indicated in laboratory work. Browse the bibliography. A 10% of the final laboratory note is awarded for the successful completion of the individual study theme.	Practical and written tests for verification of student training for laboratory activity; Checking the correctness of experimental / simulation results.	40%
10.7 Project			
10.8 Minimum performance standard:			
Course - Knowledge for mark 5 - Minimum Knowledge of Signal Numerical Processor Architecture, Set of Integrated Dedicated Resources and making a small / medium complexity diagram for a concrete application based on a numerical signal processor. Laboratory - Knowledge for mark 5 - Making all laboratory applications provided in the Discipline Data Sheet; Implement a high-level language program or assembly that contains the processor configuration elements and the use of its integrated resources.			

Date of completion

Date of approval in department

Date of approval in Council of the faculty

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 Electronics and Telecommunications**
1.4 Field of study	**Electronical engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Electronic converters modeling**					
2.2 Holder of the subject		Șchiop Adrian					
2.3 Holder of the academic seminar/laboratory/project		Șchiop Adrian					
2.4 Year of study	4	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	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	34
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	17
Tutorials	2
Examinations	2
Other activities.	0

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**42**
3.10 Number of credits	**100**

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	Room equipped with computers that have OrCAD and Matlab/Simulink environment installed

6. Specific skills acquired	
Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods.
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	▪ Knowledge of converter control techniques ▪ Knowledge of methods of modeling and simulation of multilevel inverters
7.2 Specific objectives	▪ The student is able to demonstrate that he has acquired consciousness regarding: the method of mediation in the space of state variables for different converters; converter control techniques using the mediated model of status variables; PWM control techniques applied to classical and multilevel voltage inverters; circuit control techniques for power factor correction.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Voltage and current inverter control techniques 1.1Classification of inverters 1.2 Voltage inverters 1.2.1 Single-phase inverter 1.2.1.1.1 Symmetric control with full wave 1.2.1.2 Asymmetric control with full wave 1.2.1. 3 Sinusoidal modulation for single-phase inverters 1.2.1.3.1 Bipolar modulation 1.2.1.3.2 Unipolar modulation 1.2.2 Three phase voltage inverter	conversation, exposure, explanation conversation, exposure, explanation	14

1.2.2.1 Operation after 180^0 schedule. Voltage equations. Definition of three-phase voltage inverter spatial vectors controlled on the principle of pulse modulation in duration 1.2.2.2 Sinusoidal modulation for three phase inverters 1.2.2.3 Sinusoidal modulation with symmetrical uniform sampling 1.2.2.4 Sinusoidal modulation 1.2.2.5 Selective harmonic elimination 1.2.2.6 Space vector modulation 1.2.2.6.1 Calculation algorithm specific to linearity zones 1.2.2.6.2 Calculation algorithm specific to over modulation zones 1.3 Current inverters 1.3.1 Operation after the program 120^0 1.3.2 Sinusoidal modulation 1.3.3 Selective harmonic elimination 1.3.4 Space vector modulation		
2. PWM multilevel inverter control techniques 2.1 Introduction 2.2 Types of multilevel inverters 2.3 Modeling of multilevel inverters 2.3.1 Diode clamping inverters modeling 2.3.1.1 4-level floating 2.3.2 Flying capacitor inverters modeling 2.3.2.1 Three-level three phase inverter with floating capacitors 2.3.2.2.2 Three phase 4-level inverter with floating capacitors 2.3.3 Cascade cell replacement with separate continuous voltage sources 2.4 Multilevel inverter control techniques 2.4.1 Sinusoidal modulation 2.4.1.1 Sinusoidal PWM modulation applied to flying diode inverters 2.4.1.2 Sinus PWM modulation applied to flying capacitor inverters 2.4.1.3 Sine-wave PWM modulation applied to cascading cell inverters and separate continuous voltage sources 2.4.2 Optimal PWM modulation 2.4.3 Current control of multilevel inverters.	conversation, exposure, explanation	8
3. Vector control 3.1 Vector control of voltage source inverters 3.2 Vector control of current source inverters	conversation, exposure, explanation	2
4. Circuit control techniques for power factor correction. 4.1 Feed forward method 4.2 Medium current control method 4.3 Peak current control method 4.4 Hysteresis current control method	conversation, exposure, explanation	4
Bibliography 1. A. Şchiop Contribuţii la studiul convertoarelor utilizate la acţionarea motoarelor asincrone, Editura Politehnica, 2007. 2. A. Şchiop Comanda echipamentelor electronice – Curs http://aschiop.webhost.uoradea.ro 3. I. Boldea , S.A. Nasar, Vector Control of AC Drives, CRC Press Inc. 1992. 4. B. K Bose., Modern Power Electronics and AC Drives, Prentice Hall PTR, Upper Saddle River, 2002. 5. Lascu D., Tehnici şi circuite de corecţie activă a factorului de putere, Editura de Vest, Timişoara, 2004.6. 6. Ş. Preitl, R. E. Precup, Introducere în conducerea fuzzy a proceselor, Editura Tehnică, Bucureşti, 1997.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Techniques for the control of single-phase voltage inverters. Full wave command, bipolar modulation, unipolar modulation.	conversation, exposure, explanation	2
Voltage source inverter control techniques. PWM command with symmetrical and asymmetric uniform sampling. Calculated modulation. Space vectors	conversation, exposure, explanation	2
Voltage source inverter control techniques. Study of the effect of the introduction of 3rd-order harmonics into the modulatory signals for the PWM command. Space vector modulation	conversation, exposure, explanation	2

Power inverter control techniques. Sinusoidal PWM modulation. Trapezoidal modulation. Calculated modulation. Modulation of the current space vector	conversation, exposure, explanation	2
Clamped diodes multilevel inverter control techniques	conversation, exposure, explanation	2
Flying capacitors multilevel inverter control techniques	conversation, exposure, explanation	2
Recovery of laboratories		2

Bibliography

1. A. Şchiop Contribuţii la studiul convertoarelor utilizate la acţionarea motoarelor asincrone, Editura Politehnica, 2007.
2. A. Şchiop Comanda echipamentelor electronice – Îndrumător de laborator, Editura Universităţii din Oradea, 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 acquired skills will be required for employees working in the field of design, simulation and control of electronic equipment.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Exposure of two topics of theory - Clarity, consistency, concision of presentation and explanation of topics Minimum required conditions for passing the exam (mark 5): Basics knowledge without entry into details - For 10: In-depth knowledge of converter modeling techniques		70%
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 For 10: In-depth knowledge of converter modeling techniques		30%
10.7 Project			

10.8 Minimum performance standard: Knowledge of the basic principles of the operation of the equipment studied. Exposure of theory subjects in appropriate technical language and obtaining a minimum score of 5 in laboratory activities.

Completion date:
15.09.2022

Date of endorsement in the department:
19.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics **/** Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Electronic Equipmets Testing**					
2.2 Holder of the subject		**Lect.dr.eng. Gavriluţ Ioan**					
2.3 Holder of the academic seminar/laboratory/project		**Lect.dr.eng. Gavriluţ Ioan**					
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	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					44
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					7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					0
Examinations					7
Other activities.					0
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	The classroom. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Explaining and interpreting production processes and maintenance activities for the electronic equipment, identifying the points for testing and the electrical measurements to be determined.
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	- acquiring basic knowledge on the issue of testing electronic equipment - knowledge of the structure and mode of operation and use of equipment for assisted testing - knowledge of electronic board testing (visual inspection, in-circuit testing, Boundary Scan technology)
7.2 Specific objectives	- testing the electronic circuits realized on PCB - testing electronic boards using dedicated testers - testing the functional parameters of a radio and TV receiver

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Ch. 1. Overview about electronic equipment testing (Introduction. Types of defects)	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	4
Ch. 2. Testing equipment (Logical analyzers. Signature analyzers. Testing of data converters. Self-test electronic equipments)		6
Ch. 3. Computer assisted testing (Structure of acquisition boards. Assisted testing of an audio amplifier)		4
Ch 4. Electronic boards testing (Manual and Automatic optical inspection (AOI). Electrical parameters testing. Boundary Scan technology)		5
Ch. 5. Testing the functional parameters of the radio receivers (Superheterodyne radio receivers. Measuring devices and accessories. Functional parameter testing methods)		5
Ch. 6. Testing the functional parameters of the TV receivers (Concepts used in television. Determining the characteristics of the TV receivers)		4

Bibliography		
1. I. Gavriluţ, *Testarea echipamentelor electronice*, Ed. Univ. din Oradea, 2008.		
2. M. Vladuţiu, M. Crisan, *Tehnica testării echipamentelor automate de prelucrarea datelor*, Ed. Facla, Cluj-Napoca, 1989.		
3. M. Băşoiu, M. Gavriliu, G. Pflanzer, *Funcţionarea si depanarea televizorului în culori*, Ed. Tehnică, 1895.		
4. A. Gacsádi, *Bazele televiziunii*, Ed. Univ. din Oradea, 2002.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of laboratory works and labor protection	Using the laboratory guide, presenting the paper, performing the measurements, performing the related calculations, completing the tables of results and making graphs The activity can also be carried out online	2
L. 1. Testing the connection cables		2
L. 2. Testing electronic components with the multimeter		2
L. 3. Testing an amplification stage made with a transistor		2
L. 4. Testing DC voltage stabilizers		2
L. 5. Testing a switching voltage source		2
L. 6. Testing an audio power amplifier		2
L. 7. Testing a radio receiver		2
L. 8. Testing a color TV receiver		2
L. 9. ITA Scorpion Tester		2
L. 10. In-circuit electronic components testing		2
L. 11. Testing electronic PCB		2
L. 12. Testing EPROM memories		2
Recoveries and final verification		2
Bibliography		
1. I. Gavriluţ, *Testarea echipamentelor electronice - Îndrumător de laborator*, Editat local, 2008.		
2. A. Gacsádi, *Bazele televiziunii*, Ed. Univ. din Oradea, 2002.		
3. Nicolae George, Oltean Dănuţ – Ioan, *Radiocomunicaţii: Caracteristici şi indici de calitate ai receptoarelor de radio şi televiziune. Metode de măsurare*, Univ. Transilvania din Braşov, 2003.		
4. A. Gacsádi, I. Gavriluţ, *Bazele televiziunii - Îndrumător de laborator*, Ed. Univ. din Oradea, 2008.		

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 line with what is done in other university centers in the country. In developing the discipline, the requirements of electronic engineers in the testing of electronic equipment were taken into account. Some test equipment is donated by companies in the city (Connectronics).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The level and quality of student training in the course.	written test or quizzes in the case of online assessment	70%
10.5 Academic seminar			
10.6 Laboratory	Assimilation of theoretical and practical knowledge following individual study and laboratory work.	Verification of the accumulation of knowledge and the ability to use practical applications.	30%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics of testing basic electronic components and simple electronic boards. Laboratory: carrying out the practical assembly			

Completion date:
15.09.2022

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Date of endorsement in the department:
19.09.2022

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Date of endorsement in the Faculty Board:
23.09.2022

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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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics **/** Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Electronic Systems in Robotics**					
2.2 Holder of the subject		**Lect.dr.eng. Gavriluţ Ioan**					
2.3 Holder of the academic seminar/laboratory/project		**Lect.dr.eng. Gavriluţ Ioan**					
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	4	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
Study using the manual, course support, bibliography and handwritten notes					21
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					15
Tutorials					5
Examinations					5
Other activities.					0
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	The classroom. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Applying the principles of management for the organization, from the technological point of view, of production, exploitation and service activities in the fields of applied electronics.
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 make an introduction in the field of robotics and the treatment of specific electronics problems in robotics. The structure of the industrial robots, the mechanical system, control and programming methods, coordinate transformations, etc. are presented. Finally, the main sensors used in robotics are presented. ▪ The laboratory works have in view the deepening and completion of the theoretical knowledge of the course by getting acquainted with the control of the industrial robot RV-M1, the sensory system of the robots.
7.2 Specific objectives	▪ Acquiring specific problems in robotics: robot structure, mechanical system, coordinate transformations, etc .; ▪ Understanding and using control methods and programming of robots; ▪ Knowledge of specific electronics problems in robotics; ▪ Understanding the principles of operation and structure of the main sensors used in robotics; ▪ Design and practical execution of orders for the industrial robot RV-M1.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction to robotics		2

Flexible manufacturing systems	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	2
Classification of robots. The structure of an industrial robot		2
The mechanical system of the industrial robot.		2
Control system. Generating trajectories to achieve an imposed movement.		2
Methods of driving industrial robots. Kinetic geometric models		2
Generating movement between two points in the joint space		2
Transducers used to measure position		2
Methods of position measurement		2
Speed measurement methods		2
Actuation systems		2
The robot's sensory system. Proximity sensors		2
Tactile sensors. Force-moment sensors		2
Visual sensors, robot control based on visual information processing		2
Bibliography		
V. Tiponuţ, I. Gavriluţ, A. Gacsádi, *Roboţi mobili autonomi - Conducere cu reţele neuronale artificiale*, Editura Politehnica, Timişoara, 2010		
R. Dogaru, I. Dogaru, A. Gacsádi, I. Gavrilut, *Structura şi dinamica reţelelor dinamice complexe. Reţele neliniare celulare*, Editura Matrixrom, Bucureşti, 2013		
Fr. Kovács, C. Rădulescu, *Roboti industriali*, Universitatea Tehnică Timişoara, 1992		
G. Ionescu, ş.a. *Traductoare pentru automatizări industriale*, Vol. I. Editura Tehnică, Bucureşti, 1985		
I. Gavriluţ , T. Barabás, A. Gacsádi, *Bazele roboticii - îndrumător de laborator*, Editura Universităţii din Oradea, Oradea, 2006		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of laboratory works	Using the laboratory guide, presenting the paper, performing the measurements, performing the related calculations, completing the tables of results and making graphs The activity can also be carried out online	2
Study of the flexible system FMS 2101		2
RVM1 microrobot system structure		2
Manual control of the RVM1 microrobot system		2
Programming the trajectory of the characteristic point by the learning method		2
Use of programmable automatic microcontrols		2
Control the movement of the RVM1 robot on the slide		2
Vision Station 2000		2
PTP control of the RVM1 robot to operate the Vision 2000 station		2
PTP control of the RVM1 robot to operate the NCL 2000 station.		2
Control of conditioned movements on the RVM1 robot		2
The dialogue between the robot's control system and the human operator		2
Study of transducers within the flexible system FMS 2101		2
Recoveries and final verification		2
Bibliography		
1. I. Gavriluţ , T. Barabás, A. Gacsádi, *Bazele roboticii - îndrumător de laborator*, Editura Universităţii din Oradea, Oradea, 2006		
2. Micro Robot System Mitsubishi Electric.RVM1 - Operation Manual		

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 line with what is done in other university centers in the country. In developing the discipline, the requirements of electronic engineers in the robotics were taken into account.	

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The level and quality of student training in the course.	written test or quizzes in the case of online assessment	70%
10.5 Academic seminar			
10.6 Laboratory	Assimilation of theoretical and practical knowledge following individual study and laboratory work.	Verification of the accumulation of knowledge and the ability to use practical applications.	30%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of specific electronics problems in robotics Laboratory: Carrying out the laboratory applications provided in the subject description			

Completion date:
15.09.2022

Lect.dr.eng. Gavriluţ Ioan
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http://gavrilut.webhost.uoradea.ro/

Lect.dr.eng. Gavriluţ Ioan
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Date of endorsement in the department:
19.09.2022

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro
Pagina web: http://dtrip.webhost.uoradea.ro/

Date of endorsement in the Faculty Board:
23.09.2022

Dean,
Prof.dr.eng. Mircea Ioan GORDAN
E-mail: mgordan@uoradea.ro
Pagina web: http://mgordan.webhost.uoradea.ro/

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**Medical electronics**			
2.2 Holder of the subject				Associate Prof.PhD.Castrase Simona Cristina			
2.3 Holder of the academic laboratory				Associate Prof.PhD.Castrase Simona Cristina			
2.4 Year of study	IV	2.5 Semester	7	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					33
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					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					6
Tutorials					5
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	Videoproiector -on site
5.2.for the development of the academic laboratory	Laboratory with specific equipment

6. Specific skills acquired

Professional skills	C2. Applying basic methods for the acquisition and processing of signals: C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility
Trans versal 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 acquisition by students of the concepts, methods, principles of operation of the main electromedical devices. The study and analysis of the functioning of some types of electronic circuits related to them.
7.2 Specific objectives	Introduction, deepening and systematization of knowledge regarding electronic devices and circuits used in medical equipment. Introduction, deepening and systematization of knowledge regarding some methods of processing bioelectrical signals. Familiarizing students with the principles of operation, manipulation and interpretation of data provided by some equipment used for diagnosis and treatment. Elaboration of technical specifications, installation and operation of equipment in the field of medical electronics.

8. Contents*

8.1 Course	Teaching methods	No. hours
1. Introduction to medical electronics. Elements of cellular electrophysiology and biosignals.	Direct teaching	2
2 Patient protection measures in electromedical equipment. Physiological effects of electric current. Risk factors in the use of medical equipment. Standards in patient protection		2
3. Biomedical signals. Capture and processing of biomedical signals. Transducers used in medical electronics. Electrodes for sampling biological signals: surface electrodes, needle type electrodes, microelectrodes, electrical models for electrodes. Types of electrodes. Amplification of bioelectrical signals		2

4. Equipment used in the investigation and treatment of the cardiovascular system. Elements of electrocardiography: electrical functioning of the heart, Measurement and processing of cardiac activity. Blood pressure measurement, Cardiac therapy and monitoring, ECG signal collection methods, electrocardiograph, cardiac defibrillator, respectively cardiac pacemakers.	aided by visual methods of presentation on site	4
5.Elements of electroencephalography – EEG: the functioning of the brain from an electrical point of view, methods of collecting the EEG signal, the electroencephalograph, operation, specific characteristics, evoked potentials, specific methods of filtering EEG signals.		2
6. The respiratory system and its investigation. Translators and devices used in respiratory exploration		2
7. The use of laser radiation in investigation and therapy. Applications of lasers in medical specialties		4
8. The use of ultrasound in investigation and treatment, the physical principles of ultrasound exploration. Ultrasonic transducers. Elements of ultrasound: the behavior of the human body to ultrasound, the principle equations of ultrasound, block diagram of the ultrasound, mechanical scanning, electronic scanning (sectoral and linear) in ultrasound, electronic focusing in ultrasound.		4
9. Techniques based on radiation. Elements of roentgenography: the physical principles of X-ray generation (principle equations), presentation of the medium and high power X-ray tube		2
10. Elements of computerized nuclear magnetic resonance tomography - NMR: the physical principles of nuclear magnetic resonance, the presentation of the equations and principle scheme of the tomograph, parameters used in NMR detection, constructive types of NMR tomographs, reconstruction algorithms of NMR tomographic images.		2
11. Devices for electrotherapy		2
Bibliography Strungaru R. "Electronică medicală" Bucureşti ,E.D.P. 1982 Draghiciu Nicolae, Electronica medicala , Ed. Universitatii din Oradea 2011 Popa Rustem , Electronica medicala , Ed.Matrix Rom Bucuresti 2006 T.D.Gligor, A.Policec, O.Bartos, V.Goian - "*Aparate electronice medicale*", Editura Facla, Cluj-Napoca, 1988		
8.2 Academic laboratory	Teaching methods	No. hours
1. Norms (standards) for patient protection and norms regarding the design and use of medical electronic equipment. Fire prevention measures in laboratories. Labor protection norms specific to the laboratory. Presentation of how to work in Multisim for laboratory works	application problems	2
2. Collection of biomedical signals. Amplification of biomedical signals		2
3. Electrocardiography. Instrumentation amplifier for electrocardiography.		2
4. Cardiac defibrillator		2
5. Study of an electronic sphygmomanometer, pulse and blood pressure measurement.		2
6. Medical electronic thermometers. Body temperature measurement		2
7. Ultrasound, Recovery of laboratory work, Evaluation of laboratory activity.		2
Bibliography P.Borza, I.Matlac, M.Nicu, "Aparatura biomedicala", Edit.Tehnica Bucuresti,1996 Draghiciu Nicolae –Electronica medicala , Ed. Universitatii din Oradea 2011 Popa Rustem –Electronica medicala , Ed.Matrix Rom Bucuresti 2006 Albu Daniel -Electronica medicala,indrumator de laborator.Ed. Universitatii din Oradea , 2008		

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

Adapting the course to the requirements of medical equipment manufacturers. Knowledge and skills are established as teaching objectives and specified as such in revised analytical programs, the correspondence between the content and the expectations of the academic community, community representatives, professional associations and employers.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum knowledge for grade 5:- knowledge of translators used in making medical equipment. - knowledge of an application of medical equipment - for grade 10 - thorough knowledge of all subjects ; The laboratory activity is completed and marked with a grade of 10.	Written paper / online test evaluation	70%
10.5 Seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade5): knowledge on how to represent optoelectronic devices, knowledge on the Making the report, minimum theoretical knowledge about each laboratory work. Final assessment test. The qualification obtained gives the right to enter the exam. minimum knowledge for grade 5: A practical work done during the semester and the presentation of the results For grade 10: Active participation in all laboratory work 15% of the grade from the laboratory is the evaluation of individual topics	Individual themes + online test evaluation	30%
10.7 Project	-		
10.8 Minimum performance standard: Knowledge of the constructive parts and the operating principle of different types of electromedical devices. Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of			

medical devices and equipment. Knowledge and understanding of basic notions about laboratory equipment. Participation in at least half of the courses and in all laboratory classes.

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 Electronics and Telecommunications**
1.4 Field of study	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Medical Imaging**						
2.2 Holder of the subject	Prof. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Prof. Cristian Grava						
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 (in hours)	58
Study using the manual, course support, bibliography and handwritten notes	24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	6
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	Medical electronics
4.2 related to skills	C2

5. Conditions (where applicable)

5.1. for the process of the course	Equipped with video projector or Teams application. The course can be held face-to-face or online.
5.2.for the process of the seminary/laboratory/project	Computer equipment, Matlab or Octave software and / or Teams application. The laboratory can be carried out face to face or online.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. - Designing elementary functional blocks for the digital processing of signals with hardware and software implementation.

Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics.

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

7.1 The general objective of the subject	▪ The general objective of this discipline is to familiarize students with the particularities and principles underlying the processing of medical images obtained using X-ray and MRI scans, in order to diagnose certain diseases.
7.2 Specific objectives	• The specific objectives of this discipline are to develop knowledge about the main equipment for acquiring images and the particularities of these images, in order to design algorithms for processing and analysis of medical images to assist physicians in assisted diagnosis.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction	Lecture + interactive methods	2
2. The DICOM standard		2
3. Ultrasound generation and detection		2
4. Ultrasound imaging		2
5. Principle of computed tomography (CT)		2
6. The architecture of a computed tomography equipment		2
7. Principles of nuclear magnetic resonance (NMR)		2
8. Principles of MRI-based imaging		2
9. Architecture of an MRI imaging system		2
10. Contrast in MRI images		2
11. Signal sequences used in MRI imaging		2
12. Notions of data fusion in medical imaging. Computer-assisted medical decision. Assisted diagnosis		6

Bibliography

1. 1. C. Grava, Şt. Ciurel, V. Buzuloiu – "Principii ale aparatelor de imagistică medicală" – Editura Universităţii din Oradea, 2004
2. Al.M. Morega: "Introducere în imagistica medicală", Editura MatrixRom, 2002
3. W. Birkfellner – „Applied Medical Image Processing", CRC Press, ISBN 978-1-4665-5557-0, 2014
4. N. Dey, A,S, Ashour, F. Shi, V.E. Balas – „Soft Computing Based Medical Image Analysis", Academic Press Elsevier, ISBN 978-0-12-813087-2, 2018
5. K.D. Toennies – „Guide to Medical Image Analysis. Methods and Algorithms", ISBN 978-1-4471-7320-5, Springer, 2017
6. J. Jan – „Medical Image Processing, Reconstruction and Analysis", CRC Press, ISBN 9781138310285, 2021
7. V. Rajinikanth, E. Priya, H. Lin, F. Lin – „Hybrid Image Processing Methods for Medical Image Examination", CRC Press, ISBN 9780367534967, 2021
8. E. Priya, V. Rajinikanth – „Signal and Image Processing Techniques for the Development of Intelligent Heathcare Systems", Springer, ISBN 978-981-15-6141-2, 2021
9. E. Carver, B. Carver, K. Knapp – „Medical Imaging", Elsevier, ISBN 978-0-7020-6955-0, 2021

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introductory notions of medical imaging. Introduction to MATLAB	Practical works for simulation and development of application	2
2. Manipulating medical images using a computer		2
3. Ultrasound imaging.		

4. Computed tomography	programs, debates on the problems encountered and methods for solving them	2
5. MRI-based imaging		2
6. Useful algorithms in assisted diagnosis		2
7. Recovery of laboratory works		2

Bibliography

1. C. Grava, C. Vertan, V. Buzuloiu, *Prelucrarea şi analiza imaginilor. Îndrumar de laborator*, Editura Universităţii din Oradea, 2003
2. C. Grava – „*Vedere artificială şi realitate virtuală*", Editura Universităţii din Oradea, 2008
3. R. Albu, C. Grava, *Vedere Artificială. Aplicaţii*, Editura Universităţii din Oradea, ISBN 978-606-10-1727-0, 68 p, 2016
4. K.D. Toennies – „Guide to Medical Image Analysis. Methods and Algorithms", ISBN 978-1-4471-7320-5, Springer, 2017
5. E. Carver, B. Carver, K. Knapp – „Medical Imaging", Elsevier, ISBN 978-0-7020-6955-0, 2021

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 some potential main employers of the students of this specialization. Together with disciplines such as "Shape Recognition" or "Image Processing and Analysis" it responds to practical applications that can be applied to most electronic component manufacturers in the industrial park of Oradea.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Exam result and activity during the semester	The result of the exam and the written exam (and oral, if applicable). The assessment can be done face to face or online. Activity during the semester	70%
10.5 Academic seminar	-		
10.6 Laboratory	the result of the final evaluation and the activity during the semester -	Evaluation - designing a practical application. The evaluation can be done face to face or online.	30% A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic and for the activity during the semester.
10.7 Project			
10.8. Minimum performance standard: treating at least one theory subject and the correct answer to 2 eliminatory questions at the exam, respectively designing and implementing an imposed algorithm in the laboratory.			

Completion date:
15.09.2022

Signature of the course holder

prof. Cristian Grava
cgrava@uoradea.ro
https://prof.uoradea.ro/cgrava/

Signature of the laboratory holder

prof. Cristian Grava
cgrava@uoradea.ro
https://prof.uoradea.ro/cgrava/

Date of endorsement in the department:

19.09.2022

Signature Departament Directory
prof.dr.ing. Daniel Trip
dtrip@uoradea.ro
https://prof.uoradea.ro/dtrip/

Date of endorsement in the Faculty Board:
23.09.2022

Dean's Signature
prof.univ.dr.ing. Ioan – Mircea Gordan
mgordan@uoradea.ro
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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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Neural networks					
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	IV	2.5 Semester	VIII	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

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					16 hours
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20 hours
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12 hours
Tutorials					4 hours
Examinations					6 hours
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	(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, toolbox neural networks Laboratory work can be carried out on site or online

6. Specific skills acquired	
Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. - Carrying out projects that involve hardware components (processors and software components (programming). **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Designing, using consecrated principles and methods, of low complexity systems from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics.
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	This discipline aims to familiarize students from the Applied Electronics specialization, with the basic notions in the field of artificial neural networks, recognized as dominant models of artificial intelligence.
7.2 Specific objectives	Understanding and proper use of the main models of neural calculus. Knowledge of the main architectures of neural networks. Knowledge of fundamental learning algorithms. Students will gain the ability to design, implement, test and use a neural network.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction. General - Artificial Neural Networks (ANN) definition, properties. The biological neuron.	Lecture, presentation, debate	2 hours
2. Artificial neuron. Models of an artificial neuron. Activation functions.	Lecture, presentation, debate	2 hours
3. Architectures of Artificial Neural Networks. ANN classification	Lecture, presentation, debate	2 hours
4. Training algorithms used in ANN training. Classifications and properties of training algorithms.	Lecture, presentation, debate	2 hours
5. Perceptron neural networks I - Simple perceptron.	Lecture, presentation, debate	2 hours
6. The ADALINE network. LMS algorithm. Simple perceptron capacity.	Lecture, presentation, debate	2 hours
7. Percetron neural networks II - Multilayer perceptron. Training algorithm.	Lecture, presentation, debate	2 hours
8. Neural networks based on radial functions - The interpolation problem. Learning strategies for radial basis function networks	Lecture, presentation, debate	2 hours
9. Recurrent neural networks – Hopfield network	Lecture, presentation, debate	2 hours
10. Self-organizing neural networks - Self-organizing neural networks and hebbian learning algorithm.	Lecture, presentation, debate	2 hours
11. Cellular neural networks. Basic cellular neural network.	Lecture, presentation, debate	2 hours
12. Cellular neural networks. The basic electrical circuit of an internal cell. Space-invariant cellular neural network	Lecture, presentation, debate	2 hours
13. Implementation of neural networks - Software implementation. Hardware implementation, analog and digital, hybrid implementations	Lecture, presentation, debate	2 hours

14. Applications of neural networks I - XOR problem, Parity problem, coding problem. Speech synthesis. Automatic speech recognition. Facial detection.	Lecture, presentation, debate	2 hours
Bibliography 1. Jeanny Herault, Christian Jutten: "Reseaux neuronaux et traitement du signal", Hermes, Paris 1994. 2. Cătălin-Daniel Căleanu, Virgil Tiponuţ: „Reţele neuronale – Arhitecturi şi algoritmi", Editura politehnica Timişoara, 2002 3.James A. Freeman, David M. Skapura: „Neural Networks, Algorithms, Applications and Programming Techniques", Addison-Wesley Publishing, 1991 4. D. Dumitrescu, H. Costin: „Reţele neuronale. Teorie şi aplicaţii", Ed. Teora, Bucureşti 1996 5. V.Tiponuţ, C.D. Căleanu, "Reţele neuronale. Arhitecturi şi algoritmi", Ed. Politehnica, Timişoara, 2001. 6. Course –electronic format: e.uoradea.ro		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introduction to MATLAB. Generalities. Toolboxes. Creating MATLAB programs (script files and functions). 2D and 3D representations. Presentation of the neural networking toolbox from MATLAB	Practical application	2 hours
2. Visualization of activation functions used in neural networks.	Practical application	2 hours
3. Models of neurons and artificial neural networks (RNA) I Model of artificial neuron.	Practical application	2 hours
4. Models of neurons and artificial neural networks (RNA) II - Basic architectures of RNA	Practical application	2 hours
5. The simple perceptron. - Implementation of a perceptron type network. Applications in linear separable classification. Perceptron and adaline training	Practical application	2 hours
6. The multilayer perceptron. Training of multilayer perceptron networks.	Practical application	2 hours
7. Neural networks based on radial functions - The architecture of neural networks based on radial functions. Learning strategies.	Practical application	2 hours
Bibliography 1.Laboratory guide – electronic format: e.uoradea.ro 2. C.D. Căleanu, V. Tiponuţ, "Reţele neuronale. Aplicaţii", Ed. Politehnica, Timişoara, 2002		

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 examination topics related to the design, implementation and testing of neural networks, and detailed knowledge of the principles of operation, relationships and fundamental schemes for the most used neural computing models and their applications; Minimum required	Written evaluation. The evaluation can be done face to face or online	70%

	conditions for passing the exam (mark 5): Minimum knowledge of neural computational models, of the usual types of artificial neural networks		
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	Written assessment (during the semester): report. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic. The evaluation can be done face to face or online	30 %
10.7 Project			
10.8 Minimum performance standard: Students need to know the main types of neural networks and their related training algorithms. Students must be able to implement a simple neural network that solves a specific task (implementation of logical functions, recognition of images, etc.).			

Completion date:

07.09.2022

Course holder
Lect.Eng.Reiz Romulus, PhD
email: rreiz@uoradea.ro
tel.0259408191

Seminar/laboratory/project holder
Lect.Eng.Reiz Romulus, PhD
email: rreiz@uoradea.ro
tel.0259408191

Date of endorsement in the department:
19.09.2022

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

Date of endorsement in the Faculty Board:
23.09.2022

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 The Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronic Engineering , Telecommunications and Information Technology**
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program / Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the discipline			**Optical transmision of information**				
2.2 The holder of the course activities			**sl dr. Eng. Popa Sorin**				
2.3 The holder of the seminar / laboratory / project activities			**sl dr. Eng. Popa Sorin**				
2.4 Year of study	IV	2.5 Semester	**8**	2.6 Type of evaluation	**Vp**	2.7 Disipline regime	SD

3. Estimated total time (hours per semester of teaching activities)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 laboratory	**1**
3.4 Total hours in the curriculum	**42**	of which: 3.5 course	**28**	3.6 laboratory	**14**
Distribution of time fund					36 hours
Study by textbook, course support, bibliography and notes					16
Additional documentation in the library, on specialized electronic platforms and in the field					8
Preparation of seminars / laboratories, homework, papers, portfolios and essays					5
tutorial					2
review					5
Other activities.....					-
3.7 Total hours of individual study	**36**				
3.9 Total hours per semester	**78**				
3.10 Number of credits	**3**				

4. Preconditions (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector
5.2. for the development of the seminary / laboratory / project	Computer network, optical fiber analysis software, connectors op Tice, equipment its mbinare FO

6. Specific skills acquired	
Professional skills	**C5. Application of basic knowledge, concepts and methods in: power electronics, automated systems, electricity management, electromagnetic compatibility** : - Defining the specific elements that individualize the electronic devices and circuits in the fields: power electronics, automatic systems, electricity management, telecommunications , medical electronics, car electronics, consumer goods . - Qualitative and quantitative interpretation of the operation of circuits in the fields: power electronics, automatic systems, electricity management, medical electronics, car electronics, consumer goods; analysis of the operation in terms of electromagnetic compatibility . - Design, using established principles and methods of subsystems of low complexity, in the fields of applied electronics: power electronics, automated systems, electricity management, medical electronics, car electronics, consumer goods . **C6. Solving technological problems in the fields of applied electronics** : - Define the principles and methods underlying the manufacture, adjustment, testing and servicing of appliances and equipment in the fields of applied electronics and Telecommunication DISCLOSURES . - Explaining and interpreting the production processes and maintenance activities of electronic equipment, identifying test points and electrical quantities to be measured . - Application of management principles for the technological organization of production, operation and service activities in the fields of applied electronics . - Use of criteria and methods for evaluating the quality of production and service activities in the fields of applied electronics. - Designing the manufacturing and maintenance technology (specifying the necessary components and operations) of products of low and medium complexity in the fields of applied electronics.
Transversal skills	

7. Objectives of the discipline (based on the grid of specific skills acquired)

7.1 The general objective of the discipline	This discipline aims to familiarize students, from the specialization of Telecommunications Networks and Software, with the basics in the field of fiber optic communications networks , a necessary requirement for the training of any specialist in the field .
7.2 Specific objectives	Students will acquire the ability to implement its ntreține and troubleshoot a network of telecommunications based FO.

8. Contents *

8.1 Course	teaching methods The activity can also be carried out online .	Nr. Hours / Observations
1. Introductory notions. The fundamental problem of communications	Lecture, presentation, debate	2 hours
2. Transmission medium - Constraints	Lecture, presentation, debate	2 hours
3. Optical fiber. Fiber Optic Communication Links.	Lecture, presentation, debate	2 hours
4. Optical transmitter	Lecture, presentation, debate	2 hours
5. Fiber optic cable	Lecture, exposition, struggle	2 hours
6. Optical receiver	Lecture, presentation, debate	2 hours
7. The advantages of fiber optic cable as a transmission medium.	Lecture, presentation, debate	2 hours
8. Elements of construction and topology of fiber optics	Lecture, presentation, debate	2 hours
9. Protective fiber optic coating	Lecture, presentation, debate	2 hours
10. Construction of fiber optic cables	Lecture, presentation, debate	2 hours
11.Connectors	Lecture, presentation, debate	2 hours
12.Junction	Lecture, presentation, debate	2 hours
13.Fiber optic measurements. Joint performance analysis.	Lecture, presentation, debate	2 hours
14. Exploitation of fiber optic bandwidth by multiple users	Lecture, presentation, debate	2 hours

Bibliography Green, Lynne D . Fiber Optic Communications CRC Press, B. Raton, Fl. 1993 S.Popa Optical transmission of information Ed.Univ.Oradea 2008 ElecttronicaVeneta ElecttronicaVeneta ElecttronicaVeneta educational software 2009 Franco Canestri Agilent basic optical fiber and OTDR measurement training. Agilent Photonic Measurement Division Germany . 20 13 .		
8.2 Seminar	teaching methods	Nr. Hours / Observations
-		
8.3 Laboratory	The activity can also be carried out online	
1 . Types of fiber optic cables, cable stripping.	Debate , a practical application .	2 hours
2 . Fiber optic connections.	Debate , a practical application .	2 hours
3 . Types of generated or optical . Classification of characteristics.	Debate, web documentation, of practical application .	2 hours
4 . Pulse optical transmitter operation . Optical power measurement.	Debate, a practical application	2 hours
5 . Transmission of audio frequency signals through an optical fiber.	Debate, a practical application .	2 hours
6. Fiber optic OTDR measurements .	Debate, practical application .	2 hours
7 . Fiber optic junction. Functional principles Splicer	Debate , a practical application .	2 hours
8.4 Project		
-		
Bibliography : Laboratory guide - electronic format CD		

9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic 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

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods The activity can also be carried out online .	10.3 Weight in the final grade
10.4 Course	Verification of theoretical knowledge . Proper handling and thorough examination subjects related network telecommunications on FO and know its in detail the principles of design , implementation and operation of the town most common types of networks.	Written evaluation.	70%
10.5 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.	Written evaluation (during semester): report. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic.	30%
10.7 Project	-	-	-
10.8 Minimum Performance Standard : Knowledge of the fundamental elements of theory. Recognition of various types of optical fibers, connectors. Knowledge of devices and equipment used to join optical fibers .			

Completion date: 15.09.2020

Date of endorsement in the department: 19.09.2020

Date of endorsement in the Faculty Board: 23.09.2020

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Optoelectronics**				
2.2 Holder of the subject			Associate Prof.PhD.Castrase Simona Cristina				
2.3 Holder of the academic laboratory			Associate Prof.PhD.Castrase Simona Cristina				
2.4 Year of study	IV	2.5 Semester	7	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					33
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					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					6
Tutorials					5
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	Videoproiector -on site
5.2.for the development of the academic laboratory	Laboratory with specific equipment

6. Specific skills acquired

Professional skills	C2. Applying basic methods for the acquisition and processing of signals: C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility
Transversal skills	CT1. The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks.

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

7.1 The general objective of the subject	Concepts, technologies, operating principles of the main optoelectronic devices and applications of optoelectronic devices, which operate on the basis of the emission stimulated by electromagnetic radiation.Understanding the operating principles of optoelectronic devices and circuits, as well as methods for measuring electrical quantities.
7.2 Specific objectives	The student will know the optoelectronic devices. He will master the phenomena underlying optoelectronic devices, will know the internal structure and operation of various devices, the significance components parameters, the use in applications of the catalog parameters of optoelectronic components, knowledge of the characteristics of optoelectronic components technologies, determination or by measurement) of the properties of optoelectronic components, analysis and design of simple circuits with them, knowledge of the characteristics of the main technologies for the realization of interconnection structures. 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	hours
Optoelectronics. Definitions, basic concepts. Physical sizes.		2
Electromagnetic wave. Propagation equation. Properties.		2
Electromagnetic radiation. Ripple aspects. Electromagnetic wave spectrum. Reflection and refraction of electromagnetic waves		2

Light absorption, diffusion and dispersion, Nonlinear optical phenomena	Direct teaching aided by visual methods of presentation on site	2
Light sources and black body radiation Corpuscular aspects of electromagnetic radiation. External photoelectric effect		2
Stimulated emission of electromagnetic radiation. Laser effect		2
Optoelectronic devices. Electromagnetic radiation receiving devices. General notions. Photoresistors. Photodiode. Photoelements. Solar cells		2
P-i-n photodiodes. Avalanche photodiodes. Heterojunction avalanche photodiodes. Load coupling (transfer) (CCD) devices. Phototransistors		2
Characteristic sizes of photodetectors. Limiting the performance of detectors. The noise		2
Electromagnetic radiation emitting devices. Light emitting diode. Semiconductor lasers. Laser diodes. Laser wavelength of laser diodes. Laser beam characteristics. Principle of operation of lasers.		2
Laser diodes with double heterostructure. Lasers with quantum potential pits and lasers with quantum centers. Lasers with distributed reaction. Lasers with emission through the surface of a vertical cavity		2
Optical modulators. Electro-optical modulators. Acoustic-optical modulators		2
Optical amplifiers. Erbium doped fiber amplifiers. Raman amplifiers. Pumping lasers		2
Optoelectronic systems. Optical communication systems. Optical communication channel.Transmitter.Receiver.Parameters of the communication system.Considerations on the communication system		2
Bibliography S. Castrase,Optoelectronică, Curs, ISBN 978-606-10-2079-9, Ed. Universitatii Oradea, 2019. S. Castrase, Electronică cuantică, Curs, ISBN 978-606-10-1862-8, Ed. Universitatii Oradea, 2016. Gh.Cimpoca, A.Gheboianu, Optoelectronica. Materiale, dispozitive si aplicatii, Ed. Bibliotheca,2007 C. Dan, Dumitras, Ingineria fasciculelor laser, Ed. All, ISBN: 973-571-522-8, 2004. M. Delibas, Elemente de optică şi spectroscopie, Ed. Universităţii Al. I. Cuza",Iaşi 1997 T.D. Strugariu, Laserii. Principii de funcţionare. Ed. tehnică, 1999. I. M. Popescu, Fizica si ingineria laserilor, Ed. Tehnică Bucuresti, 2000.		
8.2 Academic laboratory	Teaching methods	No. of hours
1. Presentation of the laboratory and laboratory works, labor protection. Photometry - the distance dependence of the illumination of a surface	application problems	2
2. The angle dependence of the light intensity of a source		2
3. External photoelectric effect. Photoelectric cell.		2
4. Study of the characteristics of optoelectronic devices		2
5. Study of the emission parameters of the laser diode		2
6. Optical modulators		2
7. Recovery of laboratory works, assessment of knowledge.		2
Bibliography S. Castrase, *Optoelectronică,* Îndrumător de laborator, ISBN 978-606-10-2175-8, Ed. Universitatii Oradea, 2021 P.Schiopu, Optoelectronica, Indr. de laborator, Ed. MatrixRom 2008 N. Puscas ,Lucrari experimentale de optoelectronica, fizica si ingineria laserilor, Ed. MatrixRom, 2004 I. M. Popescu, A.M. Preda, Aplicaţii ale laserilor, Ed. Tehnică Bucureşti, 1979 V. Vasiliu, Laserii cu He-Ne şi aplicaţiile lor, Ed. Ştiinţifică Bucureşti, 1987		

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 can be found in the curriculum of the Applied Electronics specialization and from other university centers that have accredited these specializations.

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 optoelectronic components technologies,, laws and theorems on electronic circuits; knowledge of the representation and operation of optoelelectronic devices,. For grade 10 thorough knowledge of the characteristics of optoelectronic components technologies, determination or by measurement) of the properties of optoelectronic components, analysis and design of simple circuits with them, knowledge of the characteristics of the main technologies for the realization of interconnection structures. ; The laboratory activity is completed and marked with a grade of 10.	Written paper / online test evaluation	70%
10.5 Seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5): knowledge on how to represent optoelectronic devices, knowledge on the operation of them, minimum knowledge on the use of electronic simulation program	Individual themes + online test evaluation	30%

	Knowledge for grade 10: knowledge of the construction and operation of optoelectronic 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. 15% of the grade from the laboratory is the evaluation of individual topics		
10.7 Project	-		
10.8 Minimum performance standard: Knowledge of the constructive parts and the principle of operation of different types of optoelectronic devices. Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of appliances and equipment in the fields of applied electronics. Knowledge of solving, how to represent and operate optoelectronics devices.Participation in at least half of the courses and in all laboratory classes.			

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 Electronics and Telecommunications
1.4 Field of study	Electronical engineering, telecommunications and information technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics

2. Data related to the subject

2.1 Name of the subject			Pattern Recognition				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Examination	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					44
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					-
Examinations					4
Other activities.					-

3.7 Total of hours for individual study	40
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	-
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	projector

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

6. Specific skills acquired

Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results. - Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - Evaluation, based on technical criteria and standards relating to environmental impact, of equipment from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - Designing, using consecrated principles and methods, of low complexity systems from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Applying the principles of management for the organization, from the technological point of view, of production, exploitation and service activities in the fields of applied electronics. - Using criteria and methods for the evaluation of quality in different production and service activities in the fields of applied electronics. - Designing the technology for the fabrication and maintenance (by pointing out at necessary components and operations) of some limited and average-complexity products in the fields of applied electronics.
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 is expected to be taught to students in the fourth year of Applied Electronics. The course addresses techniques for image analysis and processing and pattern recognition such as: Concepts of Pattern Recognition Theory, Object Recognition Using Models, Computational Techniques Used by Recognition Systems, Recognition Based on Local Traits, Comparative Analysis of Frequency Filtering and in the space field. Specific applications for Pattern Recognition, Detection of characteristic points in the

	image, Hough Transform, Applications of Morphological Transformations in Pattern Recognition.
7.2 Specific objectives	1. Knowledge and understanding - knowledge and understanding of the notions of Pattern Recognition 2. Explanation and interpretation - explaining the mathematical apparatus used - interpretation of results - interpretation of specific formulas 3. Instrumental - applications - development of abstraction skills - formation of calculation skills 4. Attitudinal - developing a positive attitude - cultivating and promoting a scientific environment focused on values - forming a positive and responsible behavior.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Concepts of the theory of Pattern Recognition	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture leaves room for student intervention for a better understanding of the notions presented by the teacher. The activity can also be carried out online.	2
2. Recognize objects using models		2
3. Computing techniques used by recognition systems		4
4. Recognition based on local features		4
5. Comparative analysis of filtration in the frequency domain and in the spatial domain. Specific applications for Pattern Recognition		4
6. Detection of characteristic points in the image		4
7. Transformed Hough		4
8. Applications of Morphological Transformations in Pattern Recognition		4

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1. P. Fabre, " Exercices de reconnaissance des formes par ordinateur ", Masson, Paris
2. J. C. Simon, " La reconnaissance des formes par algorithmes ", Masson, Paris, 1984
3. B. Escofier, J. Pagčs, " *Analyses factorielles simples et multiples* ", Dunod, 1998
4. Rachid Deriche, Gérard Giraudon *"A computational approach for corner and vertex detection"*
5. Heijmans, "Morphological Image Operators", 1994
6. Rong-Jian Chen, Bin-Chang Chieu, "Multiresolutional Image Representation and Coding Using Morphological Pyramids"
7. S.S.Liu, M.E.Jernigan, "Texture analysis and discrimination in additive noise", Computer vision, graphics and image processing 1990, vol.49
8. S. Curila, M. Curila, „Tehnici de prelucrare a imaginilor utilizate la recunoasterea formelor", Ed. Univ. Oradea, 2004

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introductory notions	The laboratory is organized in the first part of a short teacher-student debate on algorithms. Then the students will implement	4
2. Filters		4
3. Recognition algorithm based on the correlation matrix		4

4. Extract local features from intensity images	the algorithms, will note the results in their personal notebooks and will present them to the teacher. The activity can also be carried out online.	4
5. Match the models with the image		4
6. Binary morphology. Applications using Morphological Transformations.		2
7. Morphology on gray levels		2
8. Transformed Hough		2
9. Detection of characteristic points by the SUSAN algorithm		2

Bibliography

1. P. Fabre, " Exercices de reconnaissance des formes par ordinateur ", Masson, Paris
2. J. C. Simon, " La reconnaissance des formes par algorithmes ", Masson, Paris, 1984
3. B. Escofier, J. Pagčs, " *Analyses factorielles simples et multiples* ", Dunod, 1998
4. Rachid Deriche, Gérard Giraudon *"A computational approach for corner and vertex detection"*
5. Heijmans, "Morphological Image Operators", 1994
6. Rong-Jian Chen, Bin-Chang Chieu, "Multiresolutional Image Representation and Coding Using Morphological Pyramids"
7. S.S.Liu, M.E.Jernigan, "Texture analysis and discrimination in additive noise", Computer vision, graphics and image processing 1990, vol.49
8. S. Curila, M. Curila, „Tehnici de prelucrare a imaginilor utilizate la recunoasterea formelor", Ed. Univ. Oradea, 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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	In order to obtain grade 5, the following conditions must be met: - obtaining at least a grade of 5 in the laboratory test; - knowledge of the basic notions regarding Concepts of the theory of Pattern Recognition. In order to obtain grades 6, 7, 8 or 9, the students will present two subjects extracted from the package prepared with subjects that contain notions of course. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course. The activity can also be carried out online.	written	80%
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	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2022

Prof.univ. dr. Sorin CURILĂ
e-mail scurila@uoradea.ro,
http://scurila.webhost.uoradea.ro/

Date of endorsement in the department:
19.09.2022

Department Director,
Prof.univ.dr.ing. Daniel TRIP
E-mail: dtrip@uoradea.ro Pagina web:
http://dtrip.webhost.uoradea.ro/

Date of endorsement in the Faculty Board:
23.09.2022

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	Electronics and Telecommunications
1.4 Field of study	Electronical Engeneering, Telecommunications and Information Technologies
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Virtual instrumentation**						
2.2 Holder of the subject	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.3 Holder of the academic seminar/laboratory/project	**Ș.l. dr. ing. ALBU RĂZVAN DANIEL**						
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 hours
Study using the manual, course support, bibliography and handwritten notes	24
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	12
Tutorials	3
Examinations	5
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	(Conditions)
4.2 related to skills	Competences corresponding to the third year of preparation for the license in Applied Electronics

5. Conditions (where applicable)

5.1. for the development of the course	Interactive lectures using multi-media technology. The presence of students at courses is not mandatory, but is registered by the teacher in charge of the course, for the correct evaluation of students at the end of the course.
5.2.for the development of the academic seminary/laboratory/project	Attendance at the laboratory is mandatory. It is necessary to study the laboratory work.

6. Specific skills acquired	
Professional skills	C2. **Applying basic methods for the acquisition and processing of signals:** - C2.3. Using simulation environments for the analysis and processing of signals. - C2.4. Using specific methods and instruments for signal analysis. C3. **Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - C3.4 Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics**: C4.1. Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - C4.2. Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture.
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 aim of the course is understanding the operating principles and technologies underlying virtual instrumentation.
7.2 Specific objectives	After completing the discipline students will be able to: - Knowledge, understanding and use of languages specific to virtual instrumentation - To optimally select elements and methods of measurement, hardware and software, which make up an instrumentation system - To program in the language of virtual instrumentation Labview- basic level;

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Getting Started. Virtual Instrumentation. General principles. Software for Virtual Instrumentation.	Interactive lecture + video projector / Online	2
2. Introduction to LabVIEW. Elements in LabVIEW.	Interactive lecture + video projector / Online	2
3. Creating, editing and debugging a virtual tool.	Interactive lecture + video projector / Online	2
4. Creating virtual sub tools.	Interactive lecture + video projector / Online	2
5. Functions for scaling values.	Interactive lecture + video projector / Online	2
6. Own menus and element design.	Interactive lecture + video projector / Online	2
7. Programming structures.	Interactive lecture + video projector / Online	2
8. Functions for vector values. Cluster data.	Interactive lecture + video projector / Online	2
9. Graphic representations.	Interactive lecture + video projector / Online	2
10. Virtual instruments for the acquisition and generation of signals.	Interactive lecture + video projector / Online	2
11. Internet communications in LabVIEW. Call LabVIEW applications from web pages.	Interactive lecture + video projector / Online	2
12. Virtual Instrumentation with VEE-Agilent.	Interactive lecture + video projector / Online	2
13. Virtual Instrumentation with dSPACE.	Interactive lecture +	2

	video projector / Online	
14. Practical problems of interfacing virtual instruments.	Interactive lecture + video projector / Online	2
Bibliography 1. M. Tomşe – Instrumentație virtuală, Note de curs, format electronic, https://prof.uoradea.ro/mtomse 2. Francis Cottet, Octavian Ciobanu -Bazele programarii in Labview, MATRIX ROM, București. 3. R. Holonec, R. Munteanu jr. Aplicatii ale instrumentatiei virtuale in metrologie electrica, Cluj Napoca 4. R. Vârbănescu – Sisteme informatizate de măsurare, *Editura MATRIX ROM*, București, 1999. 5. http://www.ni.com		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory. Labor protection. General information on laboratory activity.	Work in groups of 1-2 students, explanations and discussions in the laboratory (including using video projection), studying laboratory papers, individual work on the computer. / The laboratory can be carried out online.	2
2. LabWIEW development environment.		2
3. Numeric functions in LabVIEW.		2
4. Array functions in LabVIEW.		2
5. Control structures in LabVIEW.		2
6. Graphic tools in LabVIEW.		2
7. Study of signal modulation using LabVIEW. Closing the situation at the laboratory.		2
Bibliography 1. M. Gordan, M. Tomşe, C. Mich şi V. Ferenc. - Măsurări electrice şi sisteme de măsurare, îndrumător de laborator, *Litografia Universităţii Oradea*, 2003. 2. M. Tomşe – Instrumentație virtuală, Lucrări de laborator, format electronic, http://mtomse.webhost/uoradea.ro		

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 what is taught in other faculties of electrical profile both from the University of Oradea and from other university centers in the country and abroad. For a better adaptation to the labor market requirements of the content of the discipline, meetings were held with representatives of the industrial and business environment in Bihor.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1. The level and quality of acquired knowledge reflected in the answers to the exam. 2. Activity during the semester + course reports	Written exam / Online assessment (Online questionnaire)	60% 10%
10.5 Academic seminar			-
10.6 Laboratory	Theoretical and practical knowledge acquired through individual study and laboratory work. Obtaining a minimum grade of 5 in the laboratory gives the right to participate in the exam.	Tests to assess theoretical and applied knowledge during the semester. Final assessment test / Assessment by tests and online questionnaire	30% 10% of the mark for the laboratory is awarded for the successful completion of the individual study topic
10.7 Project			
10.8 Minimum performance standard: Course - Requirements for grade 5 :: Knowledge of the principles of virtual instrumentation. Creating virtual tools in LabView similar to those learned in class and laboratory. All topics must be treated to a minimum. Laboratory - Requirements for grade 5: Preparation of the paper, minimum theoretical knowledge about each laboratory work. Realization of a virtual instrument of medium complexity starting from the examples from the laboratory reports.			

Completion date 05.09.2022

Signature of the course holder
S.l. dr. ing. Tomșe Marin
mtomse@yahoo.com

Signature of the laboratory holder
S.l. dr. ing. Albu Răzvan
razvanalbu85@gmail.com

Date of endorsement in the department:
19.09.2022

Signature of the department director
Prof.dr.ing. Daniel Trip
dtrip.uo@gmail.com

Date of endorsement in the Faculty Board:
23.09.2022

Signature of the Dean
Prof.dr.ing. Mircea Gordan
mirgordan@gmail.com

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	Electronics and Telecommunications
1.4 Field of study	Electronics, Telecommunications and Information Technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	APPLIED ELECTRONICS / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	MATERIALS FOR ELECTRONICS						
2.2 Holder of the subject	Lecturer dr.ing. Stașac Claudia Olimpia						
2.3 Holder of the academic seminar/laboratory/project	Lecturer dr.ing. Stașac Claudia Olimpia						
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	VP-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	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					33hours
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					6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					7
Tutorials					1
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) - Physics, Mathematics
4.2 related to skills	-Knowledge of electrical symbols, electrical diagrams, use of measuring devices, properties of materials.

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face-to-face or online -Videoprojector, Online Teaching Equipment
5.2.for the development of the academic	Seminar/laboratory/project can be conducted face-to-face or online - Equipment related to the conduct of laboratory hours

seminary/laboratory/project	- Preparation of the report, knowledge of the notions contained in the laboratory work to be carried out (synthesis material); - Performing all the laboratory work.

6. Specific skills acquired	
Professional skill	C.l. Use of basic elements related to electronic devices, circuits and instrumentation.
Transversal skills	CT3. The ability to adapt to new technologies and to document oneself in Romanian and, at least, in a language of international circulation, for professional and personal development, through continuous training.

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 of Electrotechnical Materials is designed for the purpose of presenting modern interdisciplinary problems regarding the study of electrical materials. Through the topic addressed, the course is meant to allow students to acquire basic knowledge, in the first stage, about the main phenomena that occur in the study of electrical materials.The course is also intended to facilitate students the development of basic theories and methods of physics, chemistry, suitable for the field of electrical engineering. During the course, the aim is to attract students to discussions on the issues presented so that they have an active participation
7.2 Specific objectives	▪ The laboratory work is designed to provide future engineers in the field of electrical systems. Description of basic concepts, theories and methods of physics, chemistry, suitable for the field of electrical engineering.In the first part of the class time, students are appropriated, by questions, discussions, or tests, of the theoretical notions necessary for laboratory activity, after which, under the supervision of the teacher, the experimental determinations are carried out. During the laboratory class time, discussions are held with the students, who aim to establish the knowledge, and the practical skills of carrying out the assembly schemes, the correct reading of the sizes pursued, and the method of evaluating them.

8. Contents*

8.1 Course	Teaching methods Teaching is done "online", or "face-to-face" according to requirements	No. of hours/ Observations
1.Anorganic and organic chemistry. Chemical conexion..	During teaching, student contributions are requested on course-specific topics. Some courses are conducted by teaching the subjects and debating them by students.	2
2. Crystalline corps. Defects of crystalline networks	Idem	2

3 Energy bands of the electron in crystal	Idem	2
4. Electrical conduction of metals	Idem	2
5. Electrical conduction of semiconductors	Idem	2
6. Electrical polarization	Idem	2
8. Technical and technological properties of electrotechnical materials	Idem	2
9. Conductive materials. Metals	Idem	2
10 Semiconductor materials	Idem	2
11. Gaseous and liquid electro-insulating materials	Idem	2
12. Solid electro-insulating materials	Idem	2
13 Magnetic materials	Idem	2
14. Magnetic liquids	Idem	2

Bibliography

[1]. Claudia Olimpia Staşac, D.A. Hoble – Materials for Electrotechnical and Electronics – University of Oradea Publishing House 2020 ISBN 978-606-10-2092-8
[2]. D.A. Hoble – Materials for Electrical and Electronic Engineering – University of Oradea Publishing House 2013 ISBN 978-606-10-1171-1
[3]. D. Hoble – Electrotechnical Materials – University of Oradea Publishing House 2004 ISBN 973-613-579-9
[4] D. Hoble - Electrotechnical Materials -Laboratory Advisor- U.O.-1998
[5] Rodica Helera – Materiale pentru componente electronice- Ed. MatrixRom Bucureşti 2003
[6] A.Ifrim ş.a. - Materiale electrotehnice E.D.P. - 1982

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1.Work protection rules specific to electrical equipment. Getting the basics of the study of electrical materials.	During the first hour of the laboratory will be presented by the teacher coordinator of the laboratory work of the notions related to the protection of work specific to electrical materials.	2
2. The crystalline structure.	Presentation by students of the report prepared (synthesis material). The laboratory guide is available in printed format within the Laboratory and at the University Library, with students having constant access to teaching materials. - Test on theoretical knowledge related to the laboratory - Performing	2

	experimetal determinations - Interpretation of the results obtained.	
3. Study of volume resistivity.	idem	2
4. Study of surface resistivity	idem	2
5. Determination of dielectric rigidity in solid and gaseos dielectrics	idem	2
6. Determination of the characteristic of varistors.	idem	2
7. Study of the influence of temperature on photovoltaic cells.	idem	2

Bibliography

[1] D.A. Hoble – Applications in the study of electrical materials - University of Oradea Publishing House 2017 ISBN 978-606-10-1879-6
[2]. D. Hoble – Electrotechnical Materials – University of Oradea Publishing House 2004 ISBN 973-613-579-9
[3] D. Hoble - Electrotechnical Materials -Laboratory Advisor- U.O.-1998
[4] Rodica Hella – Electronic Component Materials- Ed. MatrixRom Bucharest 2003
[5] Petre Notingher - Electrotechnical Materials. Uses. Ed. Politahnica Press - 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 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	-- For note 5: all subjects must be treated to minimum standards; - For grades >5 all subjects must be treated proportionally according to the scoring scale.	Written, oral or on-line examination	75 %
10.6 Laboratory	-- All laboratory work must be carried out, which is a condition to enter the exam.	Knowledge assessment test	25 %

10.8 Minimum performance standard:

Performing work under the coordination of a teacher, to solve problems specific to the study of electrical equipment and maintenance, maintenance and diagnosis of electrical equipment with the correct evaluation of workload, available resources, time of completion and risks, under conditions of application of occupational safety and health rules. After the promotion of the discipline, the student must have the ability to understand the mechanisms of the main phenomena that take place at the level of the structure of electrotechnical materials, their main properties, so that he can choose the right meter in the various practical engineering applications.

Completion date
29.08.2022

Course owner's signature

Lecturer. dr. ing. STAȘAC CLAUDIA OLIMPIA

Signature of the laboratory owner

Lecturer dr. ing. STAȘAC CLAUDIA OLIMPIA

Date of endorsement in the
Electrical Engineering department:

01.09.2022

Prof.univ. dr. ing.inf.habil. Hathazi Francisc Ioan

Date of endorsement in the
Electronics and Telecommunications department:

Prof. univ. dr. ing. Trip Daniel

22.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

Prof.univ.dr.ing.habil. Mircea Gordan