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

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

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

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

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Introductory seminar. Test for the evaluation of students'level of English language skills.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter Drawings in engineering: Drawing types and scales Reading. Vocabulary and conversation exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 3: **Types of views used in engineering drawings**.Vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chapter 4. Design development: the initial design phase. Collaborative development of engineering projects. Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 5. The degrees of comparison for adjectives and adverbs (revision exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 6: Engineering Design. Technical Drawing in Engineering. Types of Views Used in Engineering Drawing. Listening and speaking exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 7: Design objectives and design calculations. Vocabulary and speaking exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 8: Expressing dimensions of circles (key dimensions of circles, expressing the dimensions of pipes and ducts). Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 9: Dimensional accuracy. Discussing the concepts of precision and tolerance in engineering. Vocabulary and speaking exercises	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chapter 10: Expressing numbers and calculations. Decimals and fractions. Addition, subtraction, multiplication and division. (Listening and vocabulary exercises)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 11: Expressing area, size and mass. Referring to weight, mass, volume and density.. (Reading and exercises)	Free exposure, with the presentation of the course with video projector, on the board or	1h

	online	
Chapter 12: Measurable parameters. Defining the concepts of supply, demand, capacity, input, output and efficiency in relation to the engineering domain. (Reading and conversation exrcises**)**	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 13: 3D component features (referring to 3D forms of edges and joints and the 3D forms of fasteners) Reading and vocabulary exercises.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chapter 14: Revision of the concepts relating to the engineering domain discussed during the semester.	Free exposure, with the presentation of the course with video projector, on the board or online	1h

References:

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

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

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

10. Evaluation

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

10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
10.6 Minimum performance standard: Seminary: Capacity to use English in an appropriate way, depending on the context Capacity to produce any of the documents, written in English, presented and discussed during the seminaries Capacity to use grammatical structures accurately			

Completion date:
01.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics and Telecommunications**
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			**Modern Languages – English (1I)**				
2.2 Holder of the subject			**Lecturer PhD. Abrudan Caciora simona Veronica**				
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**I**	2.5 Semester	**1I**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

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

3.1 Number of hours per week		of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum		Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**14**
Distribution of time					50
Study using the manual, course support, bibliography and handwritten notes					22
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					11
Tutorials					4
Examinations					2
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

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

References:

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

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

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

10. Evaluation

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

10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
10.6 Minimum performance standard: Seminary: Capacity to use English in an appropriate way, depending on the context Capacity to produce any of the documents, written in English, presented and discussed during the seminaries Capacity to use grammatical structures accurately			

Completion date:
01.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of 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				**Internet Programming Technologies**			
2.2 Holder of the subject				**Assistant Professor Albu Răzvan**			
2.3 Holder of the academic seminar/laboratory/project				**Assistant Professor Albu Răzvan**			
2.4 Year of study	I	2.5 Semester	2	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 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	62 hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	-
Examinations	10
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	Classroom equipped with laptop, suitable software and video projector. The course can be held face-to-face or online.
5.2.for the development of	Laboratory room equipped with computers and dedicated software. The

the academic seminary/laboratory/project	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 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). **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	▪ Identification of current internet programming technologies (ASP .NET, WCF, web services, Web API, Javascript, NodeJs, AngularJs) ▪ Deepening knowledge of structured and object-oriented programming and web application design ▪ Studying methodologies, standards, and techniques for developing Web applications ▪ Understand, and study the technologies introduced by the Internet of Things
7.2 Specific objectives	▪ implementation of web services: SOAP and REST ▪ development of web servers and SPA (Single page application) applications ▪ implementation of cross-platform web services using WCF. ▪ development of IoT systems that control hardware equipment over the Internet using ARDUINO and Ethenret Shiled..

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Javascript		**4**
1.1 Introduction		1

1.2 Variables, constants, primitive types, dynamic types, objects, functions, vectors	Interactive presentation, problematization, exemplification	1
1.3 Operators: arithmetic, comparison, assignment, logic, bitwise, loop, decision structures,		2
2. Nodes		**4**
2.1 Introduction		1
2.2 NPM		1
2.3 Express		1
2.4 Asynchronous programming		1
3. Angular		**6**
3.1 Introduction		2
3.2 Typescript		2
3.3 Components, Angular CLI, Templates, directives, services, Dependency Injection,		2
4. Internet of Things		**2**
5. The evolution of the web, from origins to web 3.0 and IoT		**2**
6. ASP .NET WebForms		**4**
6.1. Introduction		1
6.2. WebForms controls		1
6.3. Deploy web applications using WebForms		2
7. Web services		**3**
7.1. SOAP-based ASMX services for Windows client applications		1
7.2. REST web services for mobile client applications		1
7.3. IIS web server		1
8. Windows Communication Foundation		**3**
8.1. Introduction		1
8.2. Service contracts		1
8.3. Hosting and running a WCF service		1

Bibliography

1. Albu Răzvan Daniel, Tehnologii moderne de programare în Internet, curs, 2021.
2. Naylor, Lee, ASP.NET MVC with Entity Framework and CSS, ISBN 978-1-4842-2137-2, 2016, http://www.apress.com/la/book/9781484221365
3. Leonard Richardson, Sam Ruby, RESTful Web Services, O'Reilly, ISBN: 978-0-596-52926-0, 2007.
4. Mihnea Magheti, Eduard-Cristian Popovici, Tehnologii de Programare in Internet, curs, Universitatea Politehnică București

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
L. 1. Introduction to JavaScript		2
L. 2. Creating back-end applications using NodeJS		2
L. 3. Creating front-end applications using AngularJS		2
L. 4. ASP .NET		2
L. 5. Implementation of SOAP and REST web services, publishing on an IIS server and consuming them in client applications		2
L. 6. WCF Services		2
L. 7. IoT systems using ARDUINO		2

Bibliography

1. Albu Răzvan-Daniel, Tehnologii web moderne. Aplicații de laborator, 2021.
2. 2. Naylor, Lee, ASP.NET MVC with Entity Framework and CSS, ISBN 978-1-4842-2137-2, 2016,
3. 3. Kyle Mew, Android 5 Programming by Example, Packt Publishing, 2015.

4. 4. Alex Ferrara, Matthew MacDonald, Programming .NET Web Services. Building Web Services ASP.NET and C#. O'Reilly June 2009.

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

- The content of the discipline is in accordance with what is done in other university centers in the country. The elaboration of the discipline considered the requirements that engineers in the field of electronics have regarding the use of the computer.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard. - For 10: strong knowledge of all subjects discussed in this course.	- written evaluation during the semester. The evaluation can be done face to face or online	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): in accordance with the minimum performance standard - For 10: to successfully implement all laboratory activities.	- written evaluation. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topics. The evaluation can be done face to face or online.	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining a grade of at least 5 in each laboratory test; fulfilling the requirements imposed by each laboratory activity. Course: Knowledge of the basics about current web development technologies. Academic seminar: - Laboratory: Knowledge of web development languages. Project: -			

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		Electronic Technology					
2.2 Holder of the subject		**Prof.univ.dr.Nicolae Drăghiciu**					
2.3 Holder of the academic seminar/laboratory/project		**Prof.univ.dr.Nicolae Drăghiciu**					
2.4 Year of study	I	2.5 Semester	II	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	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	
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	
5.2.for the development of the academic	

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	The course is presented in the form of a lecture. By presenting the slides that	2 hours
2. The technology for making resistors. Wound resistor technology, film resistor technology. Resistor microminiature technologies. Reliability of resistors	contain the main elements of the course, the understanding and	2 hours
3. Capacitor design technology.Fixed, variable, adjustable, special capacitors. Reliability of capacitors.	deepening of the presented notions is ensured.	2 hours
4. Coil making technology. Conductive coil construction and technology for winding, coil housing. Types of windings, winding impregnation, core types, cores characteristics	The activity can also be carried out online	2 hours
5. Passive electronic component manufacturing technology of the SMD type.		2 hours
6. Lithography and engraving techniques. Lithography. Photolithography technology. Engraving		2 hours
7. Semiconductor diode technology. Behavior of the p-n junction, classification of semiconductor diodes. Dotted diodes. Diodes broadcast. Flat epitaxial diodes. Diode Schotty		2 hours
8. Discrete transistor technology. Bipolar transistor technology. Field effect transistor technology		2 hours
9. Embedded circuit technology		2 hours

10. Technology of active electronic components of SMD type		2 hours
11. Harness technology in electronics. Linking technology by soldering. Technology of printed circuits.		2 hours
12. Technology of SMD components printed circuits. Making unprotected wiring harnesses		2 hours
13. Technology for tinning electronic components through THT holes		2 hours
14. Connect the electronic components. Conductive adhesives. Technologies for depositing conductive adhesives.		2 hours
Bibliography 1..**Electronic technology** *V. Cătuneanu*, Editura Didactică şi Pedagogică, Bucureşti, 1983. 2**. Electronic technology**,curs,Nicolae Draghiciu,ed. Imprimeriei de Vest Oradea 2009. 3. **Trends in electronic technology**, Nicolae Draghiciu Dan Scurtu, ed. Imprimeriei de Vest Oradea 2009. 4. **Surface Mount Technology;Principles and Practice**,R.P.Prasad,Chapman &Hall,1997.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Technology and characteristics of coiled resistors.	Based on the theoretical	2 hours
2. Technology and characteristics of fixed resistors with carbon or nickel film.	notions from the course, the various types of	2 hours
3. Potentiometer technology.	electronic components are	2 hours
4. Technology and characteristics of single-layer ceramic capacitors.	identified. Assemblies and their measurements are performed.	2 hours
5. Technology and characteristics of semi-variable ceramic capacitors.	Students will write the results in their personal notebooks and will present	2 hours
6. Semiconductor diodes, semiconductor diode technology	them to the teacher.	2 hours
7. Design and technology of print wiring	The activity can also be carried out online	2 hours
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	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 A practical work done during the semester and presentation of results. - For 10: Active participation in all laboratory activities	Active participation in laboratory work	30%
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 Academic seminar: Laboratory: Knowledge and use of laboratory equipment Project:			

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

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

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

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

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

References:

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

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

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

10. Evaluation

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

10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
10.6 Minimum performance standard: Seminary: Capacity to use English in an appropriate way, depending on the context Capacity to produce any of the documents, written in English, presented and discussed during the seminaries Capacity to use grammatical structures accurately			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronics and Telecommunications**
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			**Modern Languages – English (4)**				
2.2 Holder of the subject			**Lecturer PhD. Abrudan Caciora simona Veronica**				
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

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

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

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

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

References:

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

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

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

10. Evaluation

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

10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
10.6 Minimum performance standard: Seminary: Capacity to use English in an appropriate way, depending on the context Capacity to produce any of the documents, written in English, presented and discussed during the seminaries Capacity to use grammatical structures accurately			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of 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				Prof.univ.dr.ing. CORNELIA EMILIA GORDAN			
2.3 Holder of the academic seminar/laboratory/project				Şef lucrări dr.ing. LUCIAN MORGOŞ			
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 devices, circuits, systems, instrumentation and electronic 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: 25.09.2020

Date of endorsement in the department: 28.09.2020

Date of endorsement in the Faculty Board: 28.09.2021

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				Prof.univ.dr.ing. CORNELIA EMILIA GORDAN			
2.3 Holder of the academic seminar/laboratory/project				Şef lucrări dr.ing. 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 devices, circuits, systems, instrumentation and electronic 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 derivate, 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. Butterworth and Cebîsev voltage transfer functions design.	Practical application. Discussions	2 hours
3.Eliptic filters 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.

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: 25.09.2020

Date of endorsement in the department: 28.09.2020

Date of endorsement in the Faculty Board: 28.09.2021

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

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

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

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	

5. Conditions (where applicable)

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

	- attendance at seminar hours below 70% leads to the restoration of the discipline - the seminar can be held face to face or online

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

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

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

8. Contents*

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

	line	
Chapter 8. Economic competition	Free exposure, with the presentation on-line	2 h
Chapter 9. Selling prices	Free exposure, with the presentation on-line	2 h
Chapter 10. Income, Consumption and the saving process	Free exposure, with the presentation on-line	2 h
Chapter 11. Economic growth	Free exposure, with the presentation on-line	2 h
Chapter 12. The profit of the entrepreneur	Free exposure, with the presentation on-line	2 h
Chapter 13. Cyclicality of economic activities	Free exposure, with the presentation on-line	2 h
Chapter 14. Relations with the international market	Free exposure, with the presentation on-line	2 h
Total		**28 h**

Bibliography

1. Rada, Ioan Constantin, **Economie**, Ed. Anotimp, 2002
2. Rada, Ioan Constantin; Rada, Ioana Carmen, **Economie. Caiet de lucrări**, Ed. Anotimp & Adsumus, 2002
3. Rada, Ioan Constantin; Bodog, Simona;Rada, Ioana Carmen; Lăzurean, Elena Nicoleta, **Economie generală, Marketing industrial (note de curs)**, Ed. Universităţii Oradea, 2006
4. Rada, Ioan Constantin; Bodog, Simona;Rada, Ioana Carmen; Lăzurean, Elena Nicoleta, **Economie generală, Marketing industrial (aplicaţii pentru seminar)**, Ed. Universităţii Oradea, 2006
5. Rada**,** Ioan Constantin, **Economie generală I**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2009,CD-ROM
6. Rada**,** Ioan Constantin, **Economie generală II**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2009,CD-ROM
7. Rada, Ioan Constantin, **Microeconomie. Idei moderne. Vol. I**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2007
8. Rada, Ioan Constantin, **Microeconomie. Idei moderne. Vol. II**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008
9. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu**,** Liliana Doina, **Finanţe şi credit (note de curs)**, Editura Universităţii din Oradea, 2011, CD-ROM
10. Rada, Ioan Constantin; Rica, Ivan; Măgdoiu, Liliana Doina**, Finanţe şi credit (aplicaţii pentru seminar)**, Editura Universităţii din Oradea, 2011, CD-ROM
11. Nagy, Ştefan; Rada, Ioan Constantin, **Sisteme avansate de producţie (note de curs)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM
12. Nagy, Ştefan; Rada,Ioan Constantin, **Sisteme avansate de producţie (aplicaţii)**, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2008, CD-ROM

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

1. Paper: Consumer concepts 2. Report: About resources 3. Paper: The concept of competition 4. Paper: The role of the environment in obtaining production factors 5. Report: The information system of the enterprise 6. Paper: Substantiation of production cost decisions 7. Report: The production price and the profit of the entrepreneur	Students receive homework for the seminar papers or choose their homework at least a week in advance, study, design the papers and present them at the seminar. Appreciations and comments are made under the guidance of the teacher.	2 h 2 h 2 h 2 h 2 h 2 h 2 h
Total		**14 h**
Bibliography It is the one indicated for the course		

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

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

10. Evaluation

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

- Participation in all seminar work.

Completion date: 11.09.2020

Date of endorsement in the department: 24.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronic 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				**Professional Communication**			
2.2 Holder of the subject				**Lecturer PhD. Abrudan Caciora simona Veronica**			
2.3 Holder of the academic laboratory/project							
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**PE**	2.7 Subject regime	**CD**

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

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

Distribution of time	28
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	4
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	
3.9 Total of hours per semester	**28**
3.10 Number of credits	**1**

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

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

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

7.1 The general objective of the subject	- Acquiring knowledge in order to develop effective communication skills - Understanding the purpose, objectives and roles of professional communication.
7.2 Specific objectives	- Development of verbal (direct or mediated) communication skills Developing the skills for formulating and giving a speech, organizing and leading meetings, briefings, training seminars. - Developing written communication skills (notes, circulars, memorandum, report, letter, business plan, writing a scientific report and a bachelor's thesis). - Understanding and eeveloping the communication skills used in negotiation

8. Contents*

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1 Introduction: Defining communication. Factors involved in communication: message, sender and receiver. The role and importance of communication for companies. Attributes of corporate communication.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 2. Types of communication. Verbal communication, written communication, non-verbal communication: characteristics and functions. Types of non-verbal communication: facial expressions, posture, tactile communication, clothing. The connection between verbal and non-verbal means of communication.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 3 : Active listening. The role of feedback in communication. The concept of active listening. Factors that determine the success or failure of communication.	Free exposure, with the presentation of the course with video projector, on the board or online	2h

Chapter 4. Verbal communication (1). 4.1 Speeches. 4.2 Preparing the speech. 4.3 Writing the speech. 4.4 The structure of a speech: the beginning of the speech, the introduction of the speech, the content of the speech, the end. 4.5 Style elements.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 5. Verbal communication (2) Training seminars and workshops. 5.1 Ways to encourage interactivity. 5.2 Brainstorming method. 5.3 Focus group. 5.4 Role play	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
Chapter 6: Verbal communication (3). Meetings. Way of communication within the organization.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 7: Verbal communication (4). Interview as a form of communication within the organization.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 8: Written communication (1). Official correspondence. 8.1 The components of an official letter: layout and format. 8.2 The language specific to official letters. 8.3 Types of official letters.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 9: Written communication (2). The memorandum. 9.1 Presentation. Types of memorandum. 9.2 Format and content of a memorandum. 9.3 Example.	Free exposure, with the presentation of the course with video projector, on the board or online	2 h
Chapter 10: Written communication (3). Writing a scientific paper and a bachelor's thesis.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 11: Written communication (4). The report. 11.1. Types of reports. 11.2 Format and components of a report. 11.3 Example.	Free exposure, with the presentation of the course with video projector, on the board or	2h

	online	
Chapter 12: Written communication (5). Online means of communication. 12.1 E-mail: advantages and disadvantages. 12.2 Electronic messages: Vocabulary specific to the Internet and information technology 12.3 Writing an e-mail. 12.4 Writing and sending a fax.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 13: Written communication (6). Writing a Curriculum Vitae. 13.1. Types of curriculum vitae.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Chapter 14: Written communication. Writing a letter of intent. 14.1 Format of a letter of intent. 14.2 Examples of letters of intent.	Free exposure, with the presentation of the course with video projector, on the board or online	2h

References:

Abrudan Simona Veronica, *Fundamentele comunicării* economice, Editura Universitatii Lucian Blaga din Sibiu, Sibiu, 2009

Chan, Janis Fisher and Walter Oliu – *Professional Writing Skills,* CA: Advanced Communication Designs Brooks, San Anselmo, 1997

Hofstede, G., *Culture's Consequences: International Differences in Work-related Values*, Beverly Hills, California, Sage, 1980.

Jackson and Jackson, *The Perfect CV*, The Bath Press, Great Britain, 1996.

Marinescu, Valentina, *Introducere în teoria comunicării*, Editura Tritonic, Bucureşti, 2003.

Păuş, Viorica, Aura, *Comunicare şi resurse umane*, Ed. Polirom, Iaşi, 2006.

Pease, Allan, *Limbajul trupului*, Editura Polimark, Bucureşti, 1997.

Pistol, Gheorghe, *Tehnica şi strategia negocierilor. Uzanţe şi protocol*, Editura Universitară, Bucureşti, 2002.

Rada, I.C., Măgdoiu, Liliana, *Tehnici de negociere*, Editura Asociaţiei „Societatea Inginerilor de Petrol şi Gaze", Bucureşti, 2006.

Roşca Liviu, *Comunicare profesională. Aplicaţii*, Editura Universităţii „Lucian Blaga" din Sibiu, 2001.

Roșca, Liviu, *Dezvoltarea abilităţilor de comunicare*, Editura Universităţii "Lucian Blaga" din Sibiu, 2009.

Ruckle, H., *Limbajul corpului pentru manageri*, Editura Tehnică, Bucureşti, 2000

Șoproni Luminița, *Comunicare şi negociere în afaceri*, Caiet de seminar, Editura Universităţii din Oradea, 2002.

Teleșpan Constantin, *Comunicare managerială în organizația militară,* Editura Academiei Forțelor Terestre, Sibiu, 2011.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Seminar	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written exam** Students rare required to solve exercises, meant at testing the knwledge they acquired during the semester	100 %
10.6 Minimum performance standard: Seminary: Capacity to use English in an appropriate way, depending on the context Capacity to produce any of the documents, written in English, presented and discussed during the seminaries Capacity to use grammatical structures accurately			

Completion date:
09.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 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	**Analog and digital transmissions**						
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:

21.09.2020

Date of endorsement in the

department: 21.09.2020

Date of endorsement in the Faculty

Board: 28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of 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				**Reconfigurable Electronic Systems**			
2.2 Holder of the subject				**Assistant Professor Albu Răzvan**			
2.3 Holder of the academic seminar/laboratory/project				**Assistant Professor Albu Răzvan**			
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	EX	2.7 Subject regime	SD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	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	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	8
Tutorials	-
Examinations	6
Other activities.	-

3.7 Total of hours for individual study	**36**
3.9 Total of hours per semester	**76**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with laptop, suitable software and video projector. The course can be held face-to-face or online.
5.2.for the development of the academic	Laboratory room equipped with computers and dedicated software. The seminar / laboratory / project can be held face to face or online.

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:** - 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). **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	▪ Ensuring the skills needed to implement applications on diverse reconfigurable systems. ▪ Programming methods of FPGA systems ▪ Significance of real time systems based on FPGAs
7.2 Specific objectives	▪ Programming FPGAs using VIVADO. ▪ Generating DRC reports to solve design errors. ▪ HDL synthesis and implementation ▪ Design of systems with low resources, optimization by reducing the dimensions and increasing the execution speed.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Introduction	Interactive presentation, problematization, exemplification	**2**
Chapter 2. The structure of a reconfigurable system		**2**
Chapter 3. General methods for programming FPGAs		**2**
Chapter 4. VIVADO IDE		**2**
Chapter 5. Architecture of reconfigurable systems programming applications		**2**
Chapter 6. Libraries and functions for FPGA programming		**2**
Chapter 7. FPGA I / O		**2**
Chapter 8. Data synchronization and parallel execution		**4**
Chapter 9. Data transfer and synchronization between computer and FPGA		**2**
Chapter 10. Optimizing applications on FPGAs to increase execution speed or reduce size		**4**
Chapter 11. Reusing code, importing an external IP		**2**
Chapter 12. Improvements for reconfigurable systems		**2**

Bibliography

1. Albu Răzvan Daniel, Sisteme electronice reconfigurabile, curs, 2017
2. Andrew Moore, FPGAs for dummies, ISBN: 978-1-119-39047-3
3. Richard E. Haskell & Darrin M. Hanna "Digital Design using Digilent FPGA Boards", 2nd Edition,LBE Books, 2012.
4. Introduction to FPGA Design with Vivado High-Level Synthesis https://www.xilinx.com/support/documentation/sw_manuals/ug998-vivado-intro-fpga-design-hls.pdf

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
L. 1. Introduction to VIVADO IDE installation and configuration		2
L. 2. FPGA architecture, hardware design		2
L. 3. Programming in VIVADO		2
L. 4. Parallel computation algorithms		2
L. 5. VIVADO HLS		2
L. 6. Design examples, AXI standard		2
L. 7. Integration of several programs in a complete application		2

Bibliography

1. Albu Răzvan-Daniel, Trip Daniel, Sisteme reconfigurabile. Aplicații de laborator, 2017.
2. 2. Vivado® Design Suite User Guide: High-Level Synthesis
3. 3. Vivado Design Suite Documentation

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 done in other university centers in the country. The elaboration of the discipline considered the requirements that engineers in the field of electronics have regarding the use of the computer.

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.	- written evaluation during the semester. The evaluation can be done face to face or online	60%

	- For 10: strong knowledge of all subjects discussed in this course.		
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: to successfully implement all laboratory activities.	- written evaluation. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topics. The evaluation can be done face to face or online.	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining a grade of at least 5 in each laboratory test; fulfilling the requirements imposed by each laboratory activity. Course: Knowledge of the basics about FPGAs Academic seminar: - Laboratory: Knowledge of hardware description languages. Project: -			

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 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: 21.09.2020

Date of endorsement in the department: 21.09.2020

Date of endorsement in the Faculty Board: 28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	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		Ultrasounds applications					
2.2 Holder of the subject		Prof.univ.dr.Nicolae Drăghiciu					
2.3 Holder of the academic seminar/laboratory/project		Prof.univ.dr.Nicolae Drăghiciu					
2.4 Year of study	IV	2.5 Semester	VIII	2.6 Type of the evaluation	Vp	2.7 Subject regime	SD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic 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	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	7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	4
Tutorials	
Examinations	3
Other activities.	

3.7 Total of hours for individual study	**22**
3.9 Total of hours per semester	**78**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	
5.2.for the development of the academic	

seminary/laboratory/project	
6. Specific skills acquired	
Professional skills	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: C6.1 - 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	

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

7.1 The general objective of the subject	▪ Presentation of the basic theoretical notions in ultraacoustics and the main applications.
7.2 Specific objectives	▪ Presentation of the main methods of production and detection of ultrasound as well as description of technical and technological methods and procedures based on the use of ultrasound. ▪ Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility ▪ 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

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Types of waves - Plane longitudinal waves, wave equation, wave interference, ultrasonic wave attenuation.	The course is presented in the form of a lecture.	2 hours
2. Acoustic sizes - Specific acoustic impedance, acoustic energy density, acoustic intensity	Schemes are presented by rear projection	2 hours
3. Acoustic wave propagation phenomena - flat wave reflection and refraction, diffraction and diffusion of acoustic waves	course elements that ensure understanding	2 hours
4. Production of ultrasound - Mechanical transmitters, magnetostrictiv emitter.	and deepening the notions presented.	2 hours
5. Production of ultrasound I - Electromagnetic emitter, piezoelectric emitter		2 hours
6. Ultrasound propagation - ultrasound propagation in gas, ultrasound propagation in liquids, ultrasound propagation in solids		2 hours
7. Ultrasound detection - Mechanical methods of ultrasonic detection in gases, mechanical methods of ultrasound detection in liquids and solids, ultrasonic detection after thermal and optical effect	The activity can also be carried out online,with	2 hours
8. Measurement of ultrasonic wave propagation constants - Measurement of longitudinal wave velocity, measurement of attenuation constant		2 hours
9. Passive applications of ultrasound - Ultrasonic defectoscopy		2 hours
10.Passive applications of ultrasound I - Ultrasound Thickness Measurement , Surveying and Submarine Scoring, Detection of Physical Parameters in Fluids		2 hours
11. Passive applications of ultrasound II - Diagnosis and medical treatment with ultrasound		2 hours
12.Active applications of ultrasound - Mechanical processing using ultrasound		2 hours
13.Active applications of ultrasound I - Ultrasonic cleaning, ultrasonic welding		2 hours
14.Active applications of ultrasound II - Ultrasonic particle deposition, ultrasonic emulsion formation, ultrasonic drying		2 hours
Bibliography		

1. Physical and technical ultrasonic defectoscopy, Teodor Bobatel, Emil Nastase, Ed. Tehnica, Bucuresti 1980.
2. „Ultrasonic devices,, Mscheffel, Editura tehnica Bucuresti 1989
3. „Physical and technical ultraacoustics,, Badarau E.,Grumazescu M., Editura Tehnica Bucuresti,1987.
4. „Ultrasound production. Applications,, Drăghiciu N., Editura Imprimeriei de Vest-Oradea, 2007.

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Construction of various ultrasound transducers. Angular transducers and dual transceivers	Presentation of electronic schemes widely accepted	2 hours
2. Ultrasonic defectoscope, constructive and technical characteristics	Measurements and	
3. The ultrasonic defectoscope used to measure thickness	determinations with the	2 hours
4. Determination of various defects in materials using the I defectoscope.	defectoscope.	2 hours
5.Determination of various defects in materials using the defectoscope II.		2 hours
6. Production of two-dimensional images in real time, with ultrasonic translators	**The activity can also be carried out online.**	2 hours
7. Ultrasound, technical and constructive characteristics		2 hours
8. Ultrasonic cleaning of metal parts		2 hours
9. Ultrasonic drilling and cutting		2 hours
10.Measurement of ultrasonic liquid flows		2 hours
11. Measurement of liquid levels with ultrasound		2 hours
12. Ultrasonic warning installations		2 hours
13. Deposition of particles with the help of ultrasound		2 hours
14. Formation of emulsions with the help of ultrasound		2 hours

Bibliography

1. Physical and technical ultrasonic defectoscopy, Teodor Bobatel, Emil Nastase, Ed. Tehnica, Bucuresti 1980.
2. Ultrasonic devices, Mscheffel, Editura tehnica Bucuresti 1989
3. Physical and technical ultraacoustics, Badarau E.,Grumazescu M., Editura Tehnica Bucuresti,1987.
4. Ultrasound production Applications, Drăghiciu N., Editura Imprimeriei de Vest-Oradea, 2007

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

- Introduction of important non-destructive investigation methods in the fields of technological and medical research.

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 a passive ultrasound application - knowledge of an active ultrasound application. - For 10: Correct and reasoned answer to all requirements	Written Synthesis topics that include specific objectives.	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 - knowledge of how to determine defects in materials using the ultrasonic defectoscope - For 10: Active participation in all laboratory activities.	Oral Note the presence and activity along the way.	30%
10.7 Project			
10.8 Minimum performance standard: Course: Knowing and understanding the basic notions presented in the course Academic seminar: Laboratory: .- Knowledge of a passive ultrasound application - Knowledge of an active ultrasound application Project:			

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		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					62hours
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					11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					-
Examinations					9
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	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:
University of Oradea, Faculty of I.E.T.I.
Str. University, no. 1, Building Corp B, floor 2, room B 215
Postal code 410087, Oradea, Bihor county, Romania
Tel .: 0259-408194, E-mail: lmorgos@uoradea.ro

Completion date:
17.09.2020

Date of endorsement in the department:

28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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	**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 et al. - Electronic computer graphics - Teora Publishing House, Bucharest, 1996
2. M. Ghinea, V. Zamfir - MATLAB. Numerical calculation. Graphics. Applications - Teora Publishing House, Bucharest, 1995
3. M. Vladu et al. - Computer graphics in the languages PASCAL and C. Implementation - Technical Publishing House, Bucharest, 1992
4. M. Vladu et al. - Computer graphics in PASCAL and C languages. Applications - Technical Publishing House, Bucharest, 1993
5. R.Baciu, D.Volovici - Graphic processing systems - Blue Publishing House, Cluj, 1999
6. M. Pater - Elements of computer graphics - University of Oradea Publishing House, ISBN 973-613-203-X, 2002
7. Grava C. - Computer assisted graphics - available on the web page http://prof.uoradea.ro/cgrava
8. Badler N.I et al. - Simulating Humans: Computer Graphics, Animation and Control, 283 pages, 1999

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 application programs,	28
2. Introduction to MATLAB: Commands, Functions, Numerical Calculation, Graphics in MATLAB		2
3. 2D graphic transformations		6

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

Bibliography

1. Moldoveanu et al. - Electronic computer graphics - Teora Publishing House, Bucharest, 1996
2. M. Ghinea, V. Zamfir - MATLAB. Numerical calculation. Graphics. Applications - Teora Publishing House, Bucharest, 1995
3. M. Pater - Elements of computer graphics - University of Oradea Publishing House, ISBN 973-613-203-X, 2002
4. Grava C. - Computer aided graphics - available on the website, http://prof.uoradea.ro/cgrava

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:
21.09.2020

Signature of the course holder

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

Signature of the laboratory holder

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

Date of endorsement in the department:

28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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 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	- Personal computers with dedicated software programs (Matlab); - Students presence to all laboratory hours is compulsory

seminary/laboratory/project	- 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	Free presentation, with	4

equations. Exact methods. Examples and applications.	exemplification on the board. Interactive method.	
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	70 %

		assessment (Online questionnaire)	
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:
05.09.2020

Date of endorsement in the department:
15.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	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 25.09.2020

Signature of the course holder
S.l. dr. ing. Tomșe Marin
mtomse@yahoo.com
https://prof.uoradea.ro/mtomse

Signature of the laboratory holder
S.l. dr. ing. Albu Răzvan
razvanalbu85@gmail.com
http://alburazvan.blogspot.ro

Date of endorsement in the department:
28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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	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					48
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	48
3.9 Total of hours per semester	104
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
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

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

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 the algorithms, will note the results in their personal notebooks and will present them	4
2. Filters		4
3. Recognition algorithm based on the correlation matrix		4
4. Extract local features from intensity images		4
5. Match the models with the		4

image	to the teacher. The activity can also be carried out online.	
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	Oral presentation	20%

	activity can also be carried out online.		
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:
16.09.2021

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

Date of endorsement in the department:
28.09.2021

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:
28.09.2021

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			**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					48
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					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	**48**
3.9 Total of hours per semester	**104**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
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:
18.09.2020

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

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

Date of endorsement in the department:
28.09.2020

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:
28.09.2020

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	**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)					62
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					18
Tutorials					6
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	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. D. A. Forsyth, J. Ponce - “Computer Vision: A Modern approach”, Prentice Hall, 2002
3. M. Sonka, V. Hlavac, R. Boyle - “Image Processing, Analysis and Machine Vision”, Brooks / Cole Publishing, 1999
4. E. Trucco, A. Verri - “Introductory Techniques for 3-D Computer Vision”, Prentice-Hall, 1998
5. R. Jain, R. Kasturi, B. G. Schunck - “Machine Vision”, MacGraw-Hill, 1995
6. C. Grava - "Artificial vision and virtual reality", University of Oradea Publishing House, 2008
7. Jahne B. - Computer Vision and Applications, ISBN 0–12–379777-2, 2000
8. Jiang M. - Computer Vision and Image Processing, Beijing, 1999
9. Shah M. - "Fundamentals of Computer Vision", Florida, 1997

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. Vertan, “Image processing and analysis”, Printech Publishing House, Bucharest, 1999
2. C. Grava, V. Buzuloiu, “Elements of image processing and analysis”, Oradea University Publishing House, 2007
3. C. Grava, C. Vertan, V. Buzuloiu, Image processing and analysis. Laboratory guide, University of Oradea Publishing House, 2003
4. C. Grava - "Artificial vision and virtual reality", University of Oradea Publishing House, 2008
5. R. Albu, C. Grava, Artificial View. Applications, University of Oradea Publishing House, ISBN 978-606-10-1727-0, 68 p, 2016

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:
21.09.2020

Date of endorsement in the department:

28.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

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/

Signature Departament Directory

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

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 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)					74
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					15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					25
Tutorials					6
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	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.			

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/

Completion date:
21.09.2020

Date of endorsement in the department:

28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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 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	24 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	4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	-
Examinations	4
Other activities.	-

3.7 Total of hours for individual study	**24**
3.9 Total of hours per semester	**52**
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:
14.09.2020

Date of endorsement in the department:
25.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Control Systems Engineering and Management
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		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	4	2.5 Semester	8	2.6 Type of the evaluation	Continuous Assessment	2.7 Subject regime	SD - Specialized 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					36 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					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					8
Tutorials					4
Examinations					4
Other activities.					-

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	-

5. Conditions (where applicable)

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

the academic seminary/laboratory/project	- Students presence to all laboratory hours is compulsory - Students must have summarized the current laboratory work - Maximum 2 laboratory works (30%) can be recovered during the semester - A participation below 70% at the laboratory works leads to the restoration of the subject - 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 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 skills necessary for the design and use of control systems implemented with programmable logic controllers (PLCs)
7.2 Specific objectives	▪ Students acquaintance with the structure of the PLCs ▪ Acquirement of basic knowledge regarding the programming languages, internal bit memories, timers and counters, programming techniques ▪ Highlighting the features of analog interfacing and of the communication in distributed systems ▪ Acquirement of the techniques necessary for human-machine interfacing 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 closed loop control	face to face or online interactive presentation	2 hours
7. Distributed systems	face to face or online interactive presentation	2 hours

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, Helga Silaghi, V. Spoială, L. Coroiu, Z. Nagy, Automate programabile. Operare, programare, aplicaţii, Editura Universităţii din Oradea, Oradea, ISBN 978-973-759-940-7, 2009. 2. J.A. Rehg and G.J. Sartori, Programmable Logic Controllers (2nd Edition), Prentice Hall, 2 edition, 2008.		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Labor protection. Presentation of laboratory works. General presentation of the PLC.	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	Laboratory work summary and practical demonstrations using specific equipments	2 hours
Bibliography 1. Gergely E.I., Automate programabile. Aplicatii, 92 pag., Editura Universitatii din Oradea, CD-ROM EDITION ISBN: 978-606-10-1474-3, 2014 2. Gavriş M., Gergely E.I., Conducerea proceselor cu automate programabile, Editura Mediamira Cluj-Napoca, 2003		

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	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 programming of the PLCs - the ability to synthesize hardware and software requirements of the applications upon the PLCs - the ability to implement the human-machine interface - thorough knowledge regarding the PLC communication throughout industrial networks	Written examination	66,66%
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For mark 10: - thorough knowledge regarding the configuration of modular PLCs - thorough knowledge regarding the addresing of I/O and memory variables - the ability to design PLC programs in all programming languages - thorough knowledge regarding the on-line communication with the PLC - thorough knowledge	knowledge assessment test	33,33%

	regarding the processing of analog signals		

10.8 Minimum performance standard:
Course:
- knowledges regarding the structure of the PLCs
- knowledges regarding the programming languages of the PLCs
- knowledges regarding timers, counters, internal memories

Laboratory:
- knowledges regarding the PLC configuration
- knowledges regarding the PLC addressing
- the ability to write programs in Ladder Diagram
- knowledges regarding the programs documenting
- knowledges regarding the design of the wiring diagrams

Completion date:
07.09.2020

Date of endorsement in the department:
24.09.2020

Date of endorsement in the Faculty Board:
28.09.2020

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of 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)					62
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					18
Tutorials					6
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	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. O.de Vente - “Ultrasound basic training course” - Toshiba-Global Imaging, Medical Systems, Netherland, 1993
2. S. Webb - “The physics of medical imaging” - Institute of Physics Publishing, London, Medical Science Series, 1998
3. C. Grava, Şt. Ciurel, V. Buzuloiu - “Principles of medical imaging devices” - University of Oradea Publishing House, 2004
4. A.K. Jain: “Fundamentals of digital image processing”, Prentice Hall, 1989
5. C. Vertan: “Image processing and analysis”, Printech Publishing House, Bucharest, 1999
6. Al.M. Morega: "Introduction to medical imaging", MatrixRom Publishing House, 2002

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

Bibliography
1. C. Vertan, “Image processing and analysis”, Printech Publishing House, Bucharest, 1999
2. C. Grava, V. Buzuloiu, “Elements of image processing and analysis”, Oradea University Publishing House, 2007
3. C. Grava, C. Vertan, V. Buzuloiu, Image processing and analysis. Laboratory guide, University of Oradea Publishing House, 2003
4. C. Grava - "Artificial vision and virtual reality", University of Oradea Publishing House, 2008
5. R. Albu, C. Grava, Artificial View. Applications, University of Oradea Publishing House, ISBN 978-606-10-1727-0, 68 p, 2016

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.			

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/

Completion date:
21.09.2020

Date of endorsement in the department:

28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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 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		**Lect. dr. eng. Țepelea Laviniu**					
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	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

-

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: 25.09.2020

Lect. dr. eng. Țepelea Laviniu
ltepelea@uoradea.ro
https://prof.uoradea.ro/ltepelea/

Lect. dr. eng. Țepelea Laviniu
ltepelea@uoradea.ro
https://prof.uoradea.ro/ltepelea/

Date of endorsement in the department: 28.09.2020

Departament director,
Prof. dr. eng. Nistor Daniel Trip
dtrip@uoradea.ro
https://prof.uoradea.ro/dtrip/

Date of endorsement in the Faculty Board: 28.09.2020

Dean,
Prof. dr. eng. habil. 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 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: 24.09.2020

Date of endorsement in the department: 27.09.2020

Date of endorsement in the Faculty Board: 30.09.2020

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 / 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: 24.09.2020

Date of endorsement in the department: 27.09.2020

Date of endorsement in the Faculty Board: 30.09.2020

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			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	36 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	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	3
Tutorials	-
Examinations	3
Other activities.	-

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
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 prepared with subjects that contain notions of course.	written	80%

	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:
16.09.2021

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

Date of endorsement in the department:
28.09.2021

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:
28.09.2021

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	**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
25.09.2020

Signature of the course holder
S.l. dr. ing. Tomse Marin
mtomse@yahoo.com
https://prof.uoradea.ro/mtomse

Signature of the laboratory holder
S.l. dr. ing. Tomse Marin
mtomse@yahoo.com
https://prof.uoradea.ro/mtomse

Date of endorsement in the department:
28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

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	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					62
Study using the manual, course support, bibliography and handwritten notes					17
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					17
Tutorials					-
Examinations					5
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	-
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:
16.09.2021

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

Date of endorsement in the department:
28.09.2021

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:
28.09.2021

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		**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	48
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	12
Tutorials	-
Examinations	3
Other activities.	-

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
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	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

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 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, scanning systems and synchronization in television. The laboratory works consider the deepening and completion of the theoretical knowledge by getting acquainted with the defect simulation stand Lucas Nulle
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 scanning systems and synchronization in television; - Carrying out practical troubleshooting work on the TV receiver in the Lucas Nulle fault simulation stand.

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
Linear exploration (progressive linear exploration, 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
The oscilloscope. Its description and operation.		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
SECAM decoder		2
The kinescope tube		2
Vertical scanning block		2
Horizontal scanning block		2
The syncprocessor		2
The command microprocessor		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:
18.09.2020

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

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

Date of endorsement in the department:
28.09.2020

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:
28.09.2020

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 (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: 24.09.2020

Date of endorsement in the department: 27.09.2020

Date of endorsement in the Faculty Board: 30.09.2020

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 / 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	2
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	48
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	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	**48**
3.9 Total of hours per semester	**90**
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	Exposition of	2

Flexible manufacturing systems	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:
18.09.2020

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

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

Date of endorsement in the department:
28.09.2020

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:
28.09.2020

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 (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	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

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. - 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
Bibliography		
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 – *Circuite 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. Tiponuț, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicații,* 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. Tiponuț, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicații,* 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	Verification of the accumulation of knowledge and the ability to use	20%

	and laboratory work.	practical applications.	
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:

18.09.2020

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

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

Date of endorsement in the department:

28.09.2020

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:

28.09.2020

Dean,
Prof.dr.eng.habil. 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	**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. Numerical calculation. Graphics. Applications - Teora Publishing House, Bucharest, 1995
2. M. Vladu et al. - Computer graphics in PASCAL and C languages. Applications - Technical Publishing House, Bucharest, 1993
3. Grava C. - Electronic computer graphics - available on the website https://prof.uoradea.ro/cgrava
4. Badler N.I et al. – Simulating Humans: Computer Graphics, Animation and Control, 283 pag., 1999

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

The content of the discipline 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.			

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/

Completion date:
21.09.2020

Date of endorsement in the department:

28.09.2020

Signature Departament Directory

prof.dr.ing. Daniel Trip
dtrip@uoradea.ro, https://prof.uoradea.ro/dtrip/

Date of endorsement in the Faculty Board:
28.09.2020

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 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		Şchiop Adrian					
2.3 Holder of the academic seminar/laboratory/project		Şchiop 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 wiring for different electronic schemes; ▪ 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 electronic wiring 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:
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 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					74h
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					22
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					22
Tutorials					
Examinations					2
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	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:
25.09.2020

Lect. dr. eng. Țepelea Laviniu
ltepelea@uoradea.ro
https://prof.uoradea.ro/ltepelea/

Lect. dr. eng. Țepelea Laviniu
ltepelea@uoradea.ro
https://prof.uoradea.ro/ltepelea/

Date of endorsement in the department:
28.09.2020

Departament director,
Prof. dr. eng. Nistor Daniel Trip
dtrip@uoradea.ro
https://prof.uoradea.ro/dtrip/

Date of endorsement in the Faculty Board:

28.09.2020

Dean,
Prof. dr. eng. habil. 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 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

	▪

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Pointers.	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. Structures.		2
3. Unions.		4
4. Memory classes.		4
5. Dynamic memory management.		4
6. List.		4
7. Switching from Structured Programming to OOP		2
8. Instantiation of objects		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
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. Pointers.	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. Structures.		2
3. Unions.		4
4. Memory classes.		4
5. Dynamic memory management.		4
6. List.		2
7. Switching from Structured Programming to OOP		4
8. Instantiation of objects		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	10.1 Evaluation criteria	10.2	10.3 Percent from

activity		Evaluation methods	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:
16.09.2021

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

Date of endorsement in the department:
28.09.2021

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:
28.09.2021

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 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			Şchiop Adrian				
2.3 Holder of the academic seminar/laboratory/project			Şchiop 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:
20.09.2021

Date of endorsement in the department:
28.09.2021

Date of endorsement in the Faculty Board:
28.09.2021

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	36 hours
Study using the manual, course support, bibliography and handwritten notes	10 hours
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6 hours
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10 hours
Tutorials	4 hours
Examinations	6 hours
Other activities.	-

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

4. Pre-requisites (where applicable)

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

5. 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 – Artificial Neural Networks. Definition.Properties. Biological neuron. Artificial Neuron	Lecture, presentation, debate	2 hours
2. Preceptron neural networks I – Simple perceptron ADALINE network. LMS algorithm.	Lecture, presentation, debate	2 hours
3. Perceptron neural networks II. Multilayer perceptron. Training algorithm.	Lecture, presentation, debate	2 hours
4. Perceptron neural networks III – fast training algorithms for feed forward networks.	Lecture, presentation, debate	2 hours
5. Radial basis function networks. Interpolation. Learning strategies	Lecture, presentation, debate	2 hours
6. Recurrent networks – Hopfield networks.	Lecture, presentation, debate	2 hours
7. Self-organizing networks I – Hebbian learning.	Lecture, presentation, debate	2 hours
8. Self-organizing networks I - Competitive learning. SOFM algorithms.	Lecture, presentation, debate	2 hours
9. Hybrid intelligent systems I – genetic algorithms, evolution strategies	Lecture, presentation, debate	2 hours
10. Hybrid intelligent systems II – Hybrid neurogenetic systems, fuzzy logic systems, neuro-fuzzy systems.	Lecture, presentation, debate	2 hours

11. Hybrid intelligent systems III - Learning by hardening, specific algorithms: value-based methods, dynamic programming methods, Monte Carlo methods	Lecture, presentation, debate	2 hours
12. Implementation of neural networks - Software implementation. Hardware, analogue and digital implementation, hybrid implementations	Lecture, presentation, debate	2 hours
13. Neural Network Applications I - XOR Issue, Parity Issue, Coding Problem.	Lecture, presentation, debate	2 hours
14. Applications of Neural Networks II - Synthesis of Speech. Automatic speech recognition. Face 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.		
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 CD 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	Written evaluation. The evaluation can be done face to face or online	70%

	fundamental schemes for the most used neural computing models and their applications; Minimum required 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:

21.09.2020

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:
28.09.2020

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

Date of endorsement in the Faculty Board:
28.09.2020

Signature of the Dean
Dean,
Prof.habil. Ioan Mircea GORDAN, PhD
E-mail: mgordan@uoradea.ro