SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject			**Passive components and circuits**				
2.2 Holder of the subject			Associate Prof.PhD.Castrase Simona Cristina				
2.3 Holder of the academic seminar			Associate Prof.PhD.Castrase Simona Cristina				
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	Ex.	2.7 Subject regime	FD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar	**1**
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar	**14**
Distribution of time:					58
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					8
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	Videoproiector -on site, Moodle platform- online
5.2.for the development of the academic seminary	

6. Specific skills acquired	
Professional skills	C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology C2. Applying basic methods for the acquisition and processing of signals
Transversal skills	CT1. The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks.

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

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

8. Contents*

8.1 Course	Teaching methods	No. hours
Introduction to the topic of the discipline and the course. Course objectives. Elements of electrostatics. Fundamentals. Electrostatic interactions. Electric potential and electric voltage. Applications to the calculation of the field and the electrostatic potential	Direct teaching aided by visual presentation methods	4
Elements of electrokinetics. Electrical signals. Electricity. Electric current intensity. Current density vector. The mechanism of electrical conduction. Law of electric conduction. Law of conservation of electric charge. Voltage and current sources. Topology of electrical circuits.		3

Elements of magnetism. Magnetostatics. Fundamentals. The magnetic field. Magnetic induction. Magnetic field strength. Forces exerted by the magnetic field. Lorentz force. Laplace force. Conductors carried by electric currents. The interaction between electric currents. The magnetic field produced by currents. Magnetic flux and voltage		3
Passive circuit components. General properties of passive electronic components. Generalities. Definitions. Classification. Characteristic sizes. Determination of the temperature coefficient of the passive components.		2
Passive circuit components. Resistors. Definitions. Classification. Symbols. Characteristics of resistors. The electrical parameters of the resistors. Marking of resistors. Characterization of the main types of resistors. Connecting the resistors. Applications.		3
Passive circuit components. The electric capacitor. Definitions. Classification. Symbols. Parameters. Marking of capacitors. The electrical capacity of electrical capacitors. Calculation of the equivalent capacity of fixed capacitors.Applications.		3
Passive circuit components. Coils. Definitions. Classification. Symbols. Parameters. Marking of inductors. Effects associated with the induction phenomenon. Calculation of inductances. The law of induction. Magnetic field energy. Applications.		3
Other passive circuit elements. (switches, relays, connectors, connecting wires). Non-linear passive components. Thermistors. Varistors. Photoresistors. Magnetoresistors.		2
Analysis of the dynamic regime in passive circuits. Characteristic sizes. Circuits with passive components in direct current, transient mode. Applications.		2
Passive components in alternating sinusoidal mode. Sinusoidal alternating quantities. Methods of solving sinusoidal circuits. Circuits with passive components in alternating current.		3
Bibliography S. Castrase, Componente si circuite pasive, ISBN 978-606-10- 1451-4, Ed. Universitatii Oradea, 2014. Pitică Dan, Radu Mihaela, Componente electronice pasive, Litografia UTC-N, 1994 Svasta Paul, Componente și circuite pasive – Condensatoare, Editura UPB,1997 Svasta Paul, Componente și circuite pasive – Rezistoare, Editura UPB,2000		
8.2 Academic seminar	Teaching methods	No. hours
Electrostatic problems	application problems	2
Use of basic theorems in circuit analysis		2
Electrokinetic problems		4
Electromagnetism problems		2
Continuous circuits with passive components		2
Alternativ curent circuits with passive components (RL, RC, RLC)		2
Bibliography S. Castrase, Componente și circuite pasive, Culegere probleme, ISBN 978-606-10-1451-4, Ed. Univ.Oradea, 2018. T. Svasta P., Componente si circuite pasive, culegere de probleme, Ed Cavallioti, 2012 C-tin Cioaca, C. Stanescu, M Fifirig: Probleme rezolvate de electricitate, Editura Facla,1997; Petrica Criste, Probleme de Electricitate, Universitatea Bucuresti, 2012		

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum requirements for passing the exam for grade 5: knowledge of the notions of electrical signals, laws and theorems on passive devices and circuits, knowledge of how to represent and operate passive devices For grade 10 Thorough knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. Thorough knowledge of the construction and operation of passive devices, the ability to explain the operation of circuits with passive components in d.c. The seminar activity is concluded and marked with grade 10.	Written paper	70%
10.5 Academic seminar	for Note 5: Knowledge of the resolution, representation and operation of passive electronic devices for grade 10: knowledge of solving problems regarding the analysis of circuits with passive components in dc and dc mode, mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. 15% of the grade from the seminar is the evaluation of the individual topics received weekly for solving.	Individual themes	30%
10.6 Laboratory	-		
10.7 Project	-		
10.8 Minimum performance standard: Knowledge of solving, how to represent and operate passive electronic devices.			

Completion date:

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

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		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:
20.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the discipline			**ELECTRONIC DEVICES**				
2.2 Course holder			Lect. PhD. Eng. BURCA ADRIAN				
2.3 The owner of the laboratory activities			Lect. PhD. Eng. BURCA ADRIAN				
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

(I) Imposed; (O) Optional; (F) Facultative/alternative

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

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

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

4. Precondiţii (acolo unde este cazul)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

Professional skills	**C1. Using the fundamentals of devices, circuits, systems, instrumentation and electronic technology:** - Analysis of electronic circuits and systems of low/medium complexity, in order to design and measure them. - Diagnostics/troubleshooting of electronic circuits, equipment and systems. - The design and implementation of electronic circuits of small/medium complexity using the standards in the field. **C2. Application of basic methods for signal acquisition and processing:** - The use of specific methods and tools for the analysis of electronic circuits. - The design of basic electronic functional blocks with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques**: - Solving concrete practical problems that include hardware elements. - Realization of projects involving hardware and software components.
Trans versal skills	

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

7.1 The general objective of the subject	The mission of the Electronic Devices discipline in the Applied Electronics specialization is to ensure the training of competitive specialists in the field of applied electronics and telecommunications, as well as the acquisition by students of knowledge related to the constructive types of electronic devices, subassemblies and components. The rational and optimal design of the form, dimensions and quality, but also the overall functioning of electronic devices and circuits.
7.2 Specific objectives	The course is fundamental for the student's preparation, therefore it combines the two important aspects, formative and informative. Emphasis is placed on the study of electronic devices and the analysis of electronic circuits. The aim is to acquire the necessary skills and experiment with concrete schemes.

8. Contents*

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

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

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

8.5 Bibliography:

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

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

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

10. Evaluation

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

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

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

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

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

Completion date:
1.09.2023

Date of endorsement in the department:
27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Signature of the Dean
Prof.univ.dr.ing.habil. Francisc – Ioan Hathazi
University of Oradea, Faculty of I.E.T.I.
Str. University, no. 1,
Tel.: 0259 / 410.172, e-mail: ihathazi@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 amd Telecomunications
1.4 Field of study	Electrical Engineering Technology, Telecomunications 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		Fundamentals of Electrical Engineering I					
2.2 Holder of the subject		**ARION MIRCEA NICOLAE**					
2.3 Holder of the academic seminar/laboratory/project		**ARION MIRCEA NICOLAE** **ARION MIRCEA NICOLAE**					
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Ex-Exam Continuous Assessment	2.7 Subject regime	Domain Discipline

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1/1/-
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14/14/-
Distribution of time					19 hours
Study using the manual, course support, bibliography and handwritten notes					**5**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					**3**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**5**
Tutorials					**3**
Examinations					**3**
Other activities.					

3.7 Total of hours for individual study	**19**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

5.2.for the development of the academic seminary/laboratory/project	The seminar / laboratory can be held face to face or online The seminar discusses theoretical aspects of the course and their applications with personal contributions of students. The practical applications are made using the modern working means existing in the Electrical Engineering laboratory (DEGEM workstations, high-performance and current measuring devices, modeling software, etc.). Students come with the observed laboratory work Mandatory presence at all laboratories It is possible to recover during the semester 30% of the laboratory works;
6. Specific skills acquired	
Professional skills	C1. Use of fundamentals related to devices, circuits, systems, instrumentation and electronic technology C2. Application of basic methods for signal acquisition and processing C3. Application of basic knowledge, concepts and methods regarding computer system architecture, microprocessors, microcontrollers, programming languages and techniques
Transversal skills	

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

7.1 The general objective of the subject	▪ The course "Fundamentals of Electrical Engineering I" provides basic theoretical and practical technical training for first-year students, presents electromagnetic phenomena from the point of view of technical applications. It is a fundamental specialized discipline that presents calculation methods of general interest, necessary to solve various problems specific to classical or modern electrical engineering. ▪ The discipline tries to form the following attitudinal competencies: manifestation of a positive and responsible attitude towards the scientific field / optimal and creative capitalization of one's own potential in scientific activities / involvement in promoting scientific innovations / engaging in partnerships with others / participation in own development professional
7.2 Specific objectives	▪ The course "Fundamentals of Electrical Engineering I " presents basic theoretical notions of the macroscopic theory of electromagnetism, for understanding the technical applications of this theory. Elements of the theory of electric circuits are also presented in the course: the regime-based approach to electric circuits (linear electric circuits in stationary mode, non-linear direct current circuits, in permanent sinusoidal mode) as well as the specific methods of analysis of the presented electric circuits. ▪ The objectives of the discipline are the knowledge and understanding of the basic fundamental relationships regarding the macroscopic theory of electromagnetism, of electric circuits in steady-state non-linear direct current, in permanent sinusoidal regime, explaining and interpreting the behavior of electric circuits, performing calculations and determinations in electric circuits, experimental verification of the basic relationships for physical systems encountered in industrial practice, the simulation of the operation of electrical circuits with specialized software. ▪ The activity at the seminar is focused on applications specific to the chapters taught in the course and aims to form calculation skills. Applications in the field of electrical circuits are, in most cases, situations that shape real circuits in technology. ▪ The laboratory activity is focused on applications specific to the chapters taught in the course and aims at the experimental verification of the basic relations for the encountered physical systems. The performance of laboratory works offers, in addition to the formation of skills in the electrical field, the use of physical and numerical modeling, sizing of assemblies, the correct use of measuring equipment, evaluation of errors in experimental determinations performed.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 1. GENERAL ASPECTS ABOUT THE ELECTROMAGNETIC FIELD Terms and notions specific to the electromagnetic field in electrostatic, electrokinetic and stationary magnetic regimes. The general laws of electromagnetic phenomena Electrostatic potential theorem. Electric voltage The law of temporary electric polarization. Law of electric flow The law of connection between **D, E** and **P** . Law of conservation of free electric charge The law of electrical conduction	Video projector, slides and whiteboard. Interactive teaching	2
The law of electromag energy transformation. by electric conduction currents Law of magnetic flux The law of temporary magnetization The law of connection between **B, H** and **M** The law of the magnetic circuit T he law of electromagnetic induction Specific applications of the studied regimes	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 2. STATIONARY LINEAR ELECTRICAL CIRCUITS Generalities. References. DC circuit elements. Diagrams and graphs of electrical circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Voltage-current characteristics of linear circuit elements Kirchhoff's theorems. Independent equations Transfiguration theorems. Transfiguration of series connected network sides	Video projector, slides and whiteboard. Interactive teaching	2
Transfiguration of network sides connected in parallel. Transfiguration of a voltage generator into a current generator.	Video projector, slides and whiteboard. Interactive teaching	2
Methods for calculating linear electrical circuits. Kirchhoff's theorem method. Algorithm Cyclic or contour current theorem. Algorithm	Video projector, slides and whiteboard. Interactive teaching	2
Node potential theorem. Algorithm Superposition theorem. Algorithm	Video projector, slides and whiteboard. Interactive teaching	2
Power conservation theorem. Regime specific applications	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 3. NON-LINE DC ELECTRICAL CIRCUITS Nonlinear element. Characteristics Kirchhoff's theorems and small variations. Methods for solving nonlinear networks. Graphic methods.	Video projector, slides and whiteboard. Interactive teaching	2
Non-linear circuits connected in series. Nonlinear circuits connected in parallel. The characteristic of an active network side. Nonlinear element connected in series with a linear element	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 4. PERMANENTLY SINUSOIDAL ELECTRICAL CIRCUITS Generalities. Circuit elements. Resistor, Coil, Coupled Coils, Capacitor Voltage sources, current sources	Video projector, slides and whiteboard. Interactive teaching	2

Kirchhoff's theorems and Joubert's theorem in instantaneous values. Alternative sinusoidal sizes Representation of alternative sinusoidal quantities	Video projector, slides and whiteboard. Interactive teaching	2
Analytical representation (in complex) of alternative sinusoidal quantities RLC series circuit. Facial diagrams RLC parallel circuit. Facial diagrams Complex impedance and admittance Joubert's theorem and Kirchhoff's theorems in complex form	Video projector, slides and whiteboard. Interactive teaching	2
The analogy between direct current and sinusoidal alternating current Specific applications of the a.c. using Kirchhoff's theorems for stinging without magnetic couplings Electric power in single-phase alternating current circuits Specific applications of the a.c. using Kirchhoff's theorems for circuits without magnetic couplings	Video projector, slides and whiteboard. Interactive teaching	2

Bibliography

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

8.2 Seminary	Teaching methods	No. of hours/ Observations
Stationary linear electrical circuits. Kirchhoff's theorem method	Interactive whiteboard teaching applications with personal and student contributions.	2
Stationary linear electrical circuits. Cyclic current method	Interactive whiteboard teaching applications with personal and student contributions.	2
Stationary linear electrical circuits. Node potential method	Interactive whiteboard teaching applications with personal and student contributions.	2
Nonlinear electrical circuits in steady state	Interactive whiteboard teaching applications with personal and student contributions.	2
Linear electrical circuits in permanent sinusoidal mode without magnetic couplings	Interactive whiteboard teaching applications with personal and student contributions.	2
Permanent sinusoidal linear electrical circuits without magnetic couplings	Interactive whiteboard teaching applications with	2

	personal and student contributions.	
Knowledge test	Test	2
8.2 Laboratory	Teaching methods	No. of hours/ Observations
Lab presentation. Theoretical notions of health and safety protection during practical activities from the laboratory	Aspects regarding the norms of health and safety protection during work in the electrical engineering laboratory are presented and discussed. The circuit elements, the measuring devices are presented	2
Circuit elements, apparatus for measuring voltages and currents. Measurement of currents, voltages and resistances. Electric potentiometer	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Ohm's law. Experimental verification.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Series resistors. Parallel resistors. Power developed in a resistor	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Experimental verification of Kirchhoff's first theorem. Experimental verification of Kirchhoff's second theorem	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
The use of Oscilloscope for the sin-wave studdyng	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Verification of knowledge,	Verification test	2

Bibliography

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

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-	Written examination	60 %
10.6 Seminary	-	Knowledge assessment test	20 %
10.6 Laboratory	-	Knowledge assessment	20 %

		test	

10.8 Minimum performance standard:

- Understanding how to solve electrical circuit problems encountered in practical applications.
- Direct determination of electrical quantities using measuring devices.
- Solving the problems of linear electrical circuits in stationary regime, the problems of electrical circuits in permanent sinusoidal regime and the problems of electrical circuits using professional programs of numerical analysis.
- The timely solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.
- Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.

Completion date:
28.08.2023

Date of endorsement in the department:
29.08.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject			**Applied Informatics**				
2.2 Holder of the subject			**Lect. dr. eng. Țepelea Laviniu**				
2.3 Holder of the academic seminar/laboratory/project			**Assoc. As. PhD. Stud. Marcu David**				
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	VP	2.7 Subject regime	FD

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

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

Distribution of time	h
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	-
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**30**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

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

6. Specific skills acquired	
Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - Explaining and interpreting methods for the acquisition and processing of signals. - Using simulation environments for the analysis and processing of signals. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming. - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used.
Transversal skills	

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

7.1 The general objective of the subject	▪ identifying computer hardware ▪ deepening knowledge of Windows and Linux operating systems ▪ advanced use of Office software (Word, Excel, PowerPoint, etc.) ▪ knowledge and use of simulation programs in the field of electronics
7.2 Specific objectives	▪ creation of an office document at professional and scientific level ▪ making flowcharts and electronic diagrams using the Microsoft Visio program ▪ observation compared to the main elements and how to work the system they Windows and Linux ▪ installation and use of an electronic simulation program ▪ reading and writing a program in a microcontroller with the help of a programmer

8. Contents*

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

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

Bibliography

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

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

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

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

Bibliography

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

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

-

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- correctness and completeness of knowledge, - logical coherence	- written assessment or grid test in case of online assessment	50%
10.5 Academic seminar	- the ability to understand concepts presented	- computer operation or screen presentation in the online situation	10%
10.6 Laboratory	- the capacity and the way of realization and understanding of the practical applications	- computer operation or screen presentation in the online situation	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining a grade of 5 in each laboratory test; fulfilling the requirements imposed by each laboratory work . **Knowledge for graduate:** Creating a Word document at a professional and scientific level. Basic use of an electronics simulation program.			

Completion date:
16.09.2023

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

Assoc. As. PhD. Stud. Marcu David
david@marcunet.com

Date of endorsement
in the department:
27.09.2023

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

Date of endorsement
in the Faculty Board:

29.09.2023

Dean,
Prof. dr. eng. habil. Francisc - Ioan Hathazi
francisc.hathazi@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 / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		Materials for electronics					
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	I	2.5 Semester	II	2.6 Type of the evaluation	VP	2.7 Subject regime	DD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 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					33hours
Study using the manual, course support, bibliography and handwritten notes					12
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					6
Tutorials					1
Examinations					4
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online
5.2.for the development of the academic	The laboratory can take place face to face or online. The existence of the apparatus and equipment necessary for the development in optimal

seminary/laboratory/project	conditions of the works provided in the discipline file. Providing students the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	**C1. Use of fundamentals relating to devices, circuits, systems, instrumentation and electronic technology.** - Description of the functioning of electronic devices and circuits and the fundamental methods of measuring electrical quantities. **C5. Application of basic knowledge, concepts and methods from: power electronics, automatic systems, power management, electromagnetic compatibility** - Defining the specific elements that individualize electronic devices and circuits in the fields of: power electronics, automatic systems, electricity management, medical electronics, automotive electronics, consumer goods **C6.Solving technological problems in the fields of applied electronics** -Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of 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	▪ The Materials for Electronics course is designed in the sense of presenting modern problems with an interdisciplinary character regarding the study of materials for electronics. Through the topic addressed, the course is intended to allow students to acquire some basic knowledge, in the first stage, regarding the main phenomena that appear in the study of materials for electronics. The course is also intended to facilitate students' development of the basic theories and methods of physics, chemistry, suitable for the field of electronic engineering. During the course, it is aimed to involve students in discussions on the presented issues, so that they have an active participation
7.2 Specific objectives	▪ The laboratory work is designed to provide future electronic engineers with the description of basic concepts, theories and methods of physics, chemistry, appropriate for the field of electronic engineering. In the first part of the lesson, the acquisition by the students, through questions, discussions, or tests, of the theoretical notions necessary for the laboratory activity is verified, after which, under the supervision of the teaching staff, the experimental determinations are carried out. During the laboratory class, there are discussions with the students, which aim to establish the knowledge and practical skills of making mounting schemes, of correctly reading the measured quantities, as well as the method of evaluating them.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Properties of crystals. States of aggregation of bodies. Gaseous state. Liquid state. Principles of thermodynamics	Interactive lecture, presentation; video projector presentation	2 hours
Crystal bodies. Crystal networks. Defects of crystalline networks. Energy bands of the electron in a crystal. Allowed and forbidden energy bands. Aspects of electron dynamics in an ideal one-dimensional crystal. Classification of bodies according to the structure of energy bands. Classification of electrotechnical materials from an electrical point of view	Interactive lecture, presentation; video projector presentation	2 hours
Electrical conduction. Electrical conduction of metals. The classical theory of	Interactive lecture,	2 hours

electrical conductivity	presentation; video projector presentation	
Electrical conduction of semiconductors. Intrinsic conduction. Extrinsic conduction	Interactive lecture, presentation; video projector presentation	2 hours
Electrical conduction of insulators. Ionic conduction of solid insulators Electronic conduction of solid insulators	Interactive lecture, presentation; video projector presentation	2 hours
Electrical conduction of insulating liquids. Electrical conduction of gases	Interactive lecture, presentation; video projector presentation	2 hours
Penetration of insulating materials. Gas breakthrough. Penetration of insulating liquids. Penetration of solid insulators	Interactive lecture, presentation; video projector presentation	2 hours
Magnetization. General magnetic properties. Diamagnetism. Paramagnetism	Interactive lecture, presentation; video projector presentation	2 hours
Ferromagnetism. Magnetization directions. Formation of magnetic fields. Bloch walls	Interactive lecture, presentation; video projector presentation	2 hours
Displacement of Bloch walls. Magnetization of ferromagnets. The shape of the magnetization curve and the magnetic hysteresis cycle.	Interactive lecture, presentation; video projector presentation	2 hours
Ferrimagnetism. Antiferromagnetism. Losses in iron	Interactive lecture, presentation; video projector presentation	2 hours
Technical and technological properties of electrotechnical materials	Interactive lecture, presentation; video projector presentation	2 hours
Conductive materials. Metals; Semiconductor materials	Interactive lecture, presentation; video projector presentation	2 hours
Electroinsulating materials. Magnetic materials	Interactive lecture, presentation; video projector presentation	2 hours

Bibliography

1. D.A.Hoble - Materiale pentru inginerie electrica şi electronică -Editura Universitatii din Oradea 2013 ISBN 978-606-10-1171-1
2. Rodica Helera - Materiale pentru componente electronice- Ed. MatrixRom Bucureşti 2003
3. Mircea Horgos, Materiale si componente electronice, Editura Risoprint, Cluj Napoca, 2002, ISBN 973-656-232-8
4. Micu, R., Creţ, R., Materiale electrotehnice, Editura U.T. PRES, Cluj Napoca, 2002, ISBN 973-8335-47-7
5. Creţ, R., Materiale pentru electronică, Editura U.T. PRES, Cluj Napoca, 2004, ISBN 973-662-098-0,
6. Creţ, R., Dielecetrici şi Materiale magnetice, Editura Mediamira, Cluj Napoca, 2008, ISBN 978-973- 713-204-8,.
7. Ifrim, Al., Notingher, P., Materiale electrotehnice, Editura Didactică şi Pedagogică, Bucureşti, 1979
8.Electronic course – Department library and e-uoradea.ro platform

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Study of dielectric materials.	Practical application. Discussions	2 hours
2. Determination of dielectric strength.	Practical application. Discussions	2 hours
3. Study of conductive materials.	Practical application. Discussions	2 hours
4. Study of ferromagnetic materials	Practical application. Discussions	2 hours
5. Study of ferrimagnetic materials.	Practical application. Discussions	2 hours
6. The study of semiconductor materials.	Practical application. Discussions	2 hours
7. Recovery of laboratories. The end of the school situation.	Practical application. Discussions	2 hours

Bibliography

1. Îndrumător de laborator – Department library and e-uoradea.ro platform
2.Cristina Stancu, Îndrumator de laborator de materiale electrotehnice, Ed. MatrixRom, ISBN: 978-606-25-0442-7.
3. Creţ, R., Materiale electrotehnice, Îndrumător de laborator, Editura U.T. PRES, Cluj Napoca, 2007, ISBN 973-662-216-9

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 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 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.	Written test. Practical test. Discussions. Arguments.	40%
10.7 Project			
10.8 Minimum performance standard: Carrying out works under the coordination of a teaching staff, to solve specific problems in the study of materials used in the electronic industry, with the correct assessment of the workload, available resources, time required for completion and risks, under conditions of application of safety and health rules in the work. After advancing the discipline, the student must have the ability to understand the mechanisms of the main phenomena that occur at the level of the structure of materials for electronics, their main properties, so that they can choose the right material in various practical engineering applications. -Components of the grade: Verification during the course (VP), Laboratory (L) - Grade calculation formula: N=0.6VP+0.4L; - The condition for obtaining credits: N≥5; L≥5			

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:
5.09.2023

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

Date of endorsement in the department:
27.09.2023

Signature of the Dean
Prof. dr. eng.habil. Francisc – Ioan Hathazi
E-mail: ihathazi@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**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	61
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	33
Examinations	4
Other activities.	2

3.7 Total of hours for individual study	**61**
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	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
Chap. 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
Chap.2. Drawings in engineering: Drawing types and scales	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.3 Types of views used in engineering drawings..	Free exposure, with the presentation of the course with video projector, on the board or online	1h

Chap.4. Design development: the initial design phase. Collaborative development of engineering projects..	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.5 Design objectives and design calculations	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chap.6. Horizontal and vertical measurements. Expressing linear dimensions.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.7 . Locating and setting out: centrelines and offsets. Running dimensions and chain dimensions.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.8. Expressing dimensions of circles (key dimensions of circles, expressing the dimensions of pipes and ducts).	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.9 Dimensional accuracy. Discussing the concepts of precision and tolerance in engineering.	Free exposure, with the presentation of the course with video projector, on the board or online	1 h
Chap.10. Expressing numbers and calculations. Decimals and fractions. Addition, subtraction, multiplication and division.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.11. Expressing area, size and mass. Referring to weight, mass, volume and density.	Free exposure, with the presentation of the course with video projector,	1h

	on the board or online	
Chap.12 Measurable parameters. Defining the concepts of supply, demand, capacity, input, output and efficiency in relation to the engineering domain.	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.13. 3D component features (referring to 3D forms of edges and joints and the 3D formd of fasteners)	Free exposure, with the presentation of the course with video projector, on the board or online	1h
Chap.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, Bențea 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 knowledge 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:

29.08.2023

Signature of the discipline holder

Abrudan Caciora Simona Veronica
e-mail: veronicaabrudan@yahoo.com

Date of endorsment in the department:

18.09.2023

Signature of the Head of the Department

Prof.univ.dr.ing. Helga Silaghi
e-mail: hsilaghi@uoradea.ro

Date of endorsement in the department

27.09.2023

Signature of the Head of the Department

Prof. univ. dr. ing. Daniel Nistor Trip
e-mail: dtrip@uoradea.ro

Date of endorsement in the

Signature of the Dean

Faculty Board: Prof.univ.dr.ing.inf.habil. Francisc – Ioan Hathazi

Date de contact:

e-mail: ihathazi@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 Electrical Engineering**
1.4 Field of study	**Control systems engineering**
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	**1**	of which: 3.2 course		3.3 academic seminar /laboratory/project	**1**
3.4 Total of hours from the curriculum	**28**	Of which: 3.5 course		3.6 academic seminar/ laboratory/project	**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	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
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,	1h

	on the board or 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, Bențea 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:

29.08.2023

Signature of the discipline holder

Abrudan Caciora Simona Veronica
e-mail: veronicaabrudan@yahoo.com

Date of endorsment in the department:

18.09.2023

Signature of the Head of the Department

Prof.univ.dr.ing. Helga Silaghi
e-mail: hsilaghi@uoradea.ro

Date of endorsement in the department

27.09.2023

Signature of the Head of the Department

Prof. univ. dr. ing. Daniel Nistor Trip
e-mail: dtrip@uoradea.ro

Date of endorsement in the

Signature of the Dean

Faculty Board: Prof.univ.dr.ing.inf.habil. Francisc – Ioan Hathazi

Date de contact:

e-mail: ihathazi@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 Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics**

2. Data related to the subject

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

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

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

Distribution of time	19
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	2
Tutorials	1
Examinations	3
Other activities.	

3.7 Total of hours for individual study	**19**
3.9 Total of hours per semester	**75**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Video-projector, whiteboard or online platform. Course can be face-to-face or online.
5.2.for the development of the academic seminary/laboratory/project	Computer networks laboratory, with specific equipment or online resources. Seminary/laboratory/project can be face-to-face or online

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

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

7.1 The general objective of the subject	Providing basic skills in computer programming
7.2 Specific objectives	Knowledge of computer structure Knowledge of basic elements for algorithmic and structured programming Knowledge of the basic elements for a high-level language Acquiring abilities for analyzing a problem and solving it using the computer Acquiring abilities for writing, executing, debugging a program written in a high-level language

8. Contents

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

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

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

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

10. Evaluation

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

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. Structured programming.	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture leaves room for student intervention for a better understanding of the notions presented by the teacher. The activity can also be carried out online.	2
2. Functions.		4
3. Pointers: variables, operations, transmission.		4
4. Pointers: connection to the boards, memory management, accessing through pointers.		4
5. Recursivity.		4
6. Strings, functions for characters and for strings.		4
7. ANSII standard and Unicode standard.		2
8. Processing of files.		2
9. Switching from structured programming to POO.		2

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 1999, 2007
3. M. Curila S. Curila, "*Programarea in C şi C ++*", Editura Universităţii din Oradea, 2008, 300 pagini, ISBN 978-973-759-554
4. Bjarne Stroustrup, C++ Programming Language, Editura Pearson Education, ianuarie 2013
5. R.-D. Albu, M. Curilă, S. Curilă, "Programarea în C ++ Indrumator de laborator", ediția 2 revizuită pentru CD, Editura Universităţii din Oradea, 2020, 152 pagini, ISBN 978-606-10-2118-5

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

Bibliography

1. Kris Jamsa, Lars Klander, ″Totul despre C si C++. Manual fundamental de programare in C si C++″, Teora, 2001
2. Clayton Wanum, ″Secrete – Programare in Windows 98″, Teora, 1999, 2007
3. M. Curila S. Curila, "*Programarea in C şi C ++*", Editura Universităţii din Oradea, 2008, 300 pagini, ISBN 978-973-759-554
4. Bjarne Stroustrup, C++ Programming Language, Editura Pearson Education, ianuarie 2013
5. R.-D. Albu, M. Curilă, S. Curilă, "Programarea în C ++ Indrumator de laborator", ediția 2 revizuită pentru CD, Editura Universităţii din Oradea, 2020, 152 pagini, ISBN 978-606-10-2118-5

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

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

10. Evaluation

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

Completion date:
1.09.2023

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

Date of endorsement in the department:
27.09.2023

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:
28.09.2023

Dean,
Prof.univ.dr. habil. Francisc Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Electronic Technology					
2.2 Holder of the subject		Moldovan Liviu					
2.3 Holder of the academic seminar/laboratory/project		Moldovan Liviu					
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14
Distribution of time					58 hours
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					21
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					7
Examinations					5
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

seminary/laboratory/project	

6. Specific skills acquired

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

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

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

8. Contents*

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

12. Technology of SMD components printed circuits. Making unprotected wiring harnesses		2
13. Technology for tinning electronic components through THT holes		2
14. Connect the electronic components. Conductive adhesives. Technologies for depositing conductive adhesives.		2
Bibliography 1. Electronic technology, cours, Nicolae Draghiciu,ed. Imprimeriei de Vest Oradea 2009 2. Trends in electronic technology, Nicolae Draghiciu Dan Scurtu, ed. Imprimeriei de Vest Oradea 2009 3. Electronic Components and Technology, Stephen Sangwine, CRC Press, 2007 4. Electronics Technology Fundamentals, Robert T. Paynter, B. J. Toby Boydell, Pearson/Prentice Hall, 2007		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Technology and characteristics of coiled resistors.	Method based on direct and indirect action and simulated action,	2
2. Technology and characteristics of fixed resistors with carbon or nickel film		2
3. Potentiometer technology		2
4. Technology and characteristics of single-layer ceramic capacitors		2
5. Technology and characteristics of semi-variable ceramic capacitors		2
6. Semiconductor diodes, semiconductor diode technology		2
7. Design and technology of print wiring		2
Bibliography 1. Electronic technology, Practical works. Vol I şi Vol II. ,Virgil Maier, Mircea Chindriş, Rodica Creţ, Editura Institutului Politehnic Cluj Napoca, 1990. 2. Electronic technology, Laboratory works works, Draghiciu Nicolae , Editura Universitatii din Oradea ,2012		

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - knowledge of the technology of making a resistor - knowledge of the technology of making a capacitor. - For 10: Correct and reasoned answer to the evaluation requirements	Written Synthesis topics that include specific objectives	70%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard A practical work done	Active participation in laboratory work	30%

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

Completion date: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

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 the academic seminary/laboratory/project	Laboratory room equipped with computers and dedicated software. The seminar / laboratory / project can be held face to face or online.

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using 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	Interactive presentation, problematization, exemplification	1
1.2 Variables, constants, primitive types, dynamic types, objects, functions, vectors		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: 25.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

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

(I) Imposed; (O) Optional; (F) Facultative/alternative

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

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

Distribution of time	44 hours
Study using the manual, course support, bibliography and handwritten notes	12
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	-
Examinations	9
Other activities.	-

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

4. Precondiţii (acolo unde este cazul)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

Professional skills	**C1. Using the fundamentals of devices, circuits, systems, instrumentation and electronic technology:** - Analysis of electronic circuits and systems of low/medium complexity, in order to design and measure them. - Diagnostics/troubleshooting of electronic circuits, equipment and systems. - The design and implementation of electronic circuits of small/medium complexity using the standards in the field. **C2. Application of basic methods for signal acquisition and processing:** - The use of specific methods and tools for the analysis of electronic circuits. - The design of basic electronic functional blocks with hardware and software implementation. **C3. Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques**: - Solving concrete practical problems that include hardware elements. - Realization of projects involving hardware and software components.
Trans versal skills	

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

7.1 The general objective of the subject	• The mission of the Fundamental Electronic Circuits discipline in the Bachelor of Applied Electronics study program is to ensure the training of competitive specialists in the field of applied electronics and telecommunications regarding the students' acquisition of knowledge related to the constructive types of electronic devices, subassemblies and fundamental electronic circuits . • The design and implementation of electronic circuits of small/medium complexity using technologies and the standards in the field
7.2 Specific objectives	The course is fundamental for the student's preparation, therefore it combines the two important aspects, formative and informative. The course focuses on the study, analysis and design of elementary electronic circuits. The aim is to acquire the necessary skills, as well as to experiment with concrete fundamental schemes.

8. Contents*

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

14. Switching circuits with discrete elements. Monostable	Presentation of theoretical elements and examples of practical applications. Discussions and questions	2
Bibliography: [1] D.Dascalu, M.Profirescu, A.Rusu; Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982 [2] D.Scurtu, C.Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Universitatii din Oradea, 2004 [3] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Universităţii din Oradea, 2010 [4] A.Burca, C.Gordan: Dispozitive electronice, Curs format electronic, 2015		
8.2 Seminar	Teaching methods	No. Hours / Observations
8.3 **Laboratory**	Teaching methods	No. Hours / Observations
L1. Repeater on emitter	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L2. Amplifier with transistor in EC connection	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L3. Amplifier with transistor in BC connection	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L4. Amplifier in DC connection with JFET	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L5. Voltage stabilizers I (with discrete components)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L6. Voltage stabilizers II (with specialized integrated circuits)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L7. Protection for voltage and current stabilizers	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L8. Operational Amplifiers. Applications (I)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L9. Operational Amplifiers. Applications (II)	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L10. RC oscillators	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L11. LC oscillators	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L12. Switching circuits, bistable	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L13. Switching circuits, astable, monostable	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
L14. Final check.	Using the laboratory guide, presenting the work, performing the measurements, performing the related calculations and completing the results tables	2
8.4 Project		
8.5 Bibliography:		
[1] D.Dascalu, M.Profirescu, A.Rusu: Dispozitive si circuite electronice, Ed. Didactica si pedagogica, Bucuresti 1982 [2] C.Gordan, L.Tepelea, R.Reiz, L.Morgoş: Electronică analogică şi digitală, Editura Univer. din Oradea, 2010 [3] D.Scurtu, C. Gordan: Dispozitive si circuite electronice, Indrumar de laborator, Ed. Univ. din Oradea, 2004 [4] S.Castrase, A.Burca, C.Gordan: *Dispozitive şi circuite electronice*, Îndrumător de lucrări de laborator, ISBN 978-606-10-1610-5, Editura Universităţii din Oradea 2015		

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

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

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

10. Evaluation

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

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

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

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

Completion date:
1.09.2023

Date of endorsement in the department:

27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Signature of the Dean
Prof.univ.dr.ing.habil. Francisc – Ioan Hathazi
University of Oradea, Faculty of I.E.T.I.
Str. University, no. 1,
Tel.: 0259 / 410.172, e-mail: ihathazi@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 seminary/laboratory/project	Laboratory room with the devices related to the proposed works. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired

Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. **C2. Applying basic methods for the acquisition and processing of signals:** - Using specific methods and instruments for signal analysis. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods.
Transversal skills	

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

7.1 The general objective of the subject	The discipline addresses the issue of structure, operation and applications with analog circuits. The domain is presented gradually, from the description of the main parameters to complex applications using analog integrated circuits. The objective is to ensure the theoretical and practical support necessary for the use of analog integrated circuits and the subsequent study of related disciplines.
7.2 Specific objectives	- description of the circuits that compose the analog integrated circuits - description of the operation of the operational amplifier - basic AO configurations (integrators, branch circuits, precision rectifiers, comparators, etc.)

8. Contents*

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

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 – C*ircuite integrate analogice - Analiză şi proiectare* - Ed. Teh., Buc. 1998		
A. Manolescu, A Manolescu - *Circuite integrate liniare (Culegere de probleme)* - Ed. Şt. şi Enc. Buc. 1987		
Lar Călin - *Circuite analogice - Îndrumător de laborator* - Ed. Univ. Oradea 2003		
M. Ciugudean, V. Tiponuţ, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicaţii*, Ed. Facla Timişoara, 1986.		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of laboratory works and labor protection	Using the laboratory guide, presenting the paper, performing the measurements, performing the related calculations, completing the tables of results and making graphs The activity can also be carried out online	2
L1. Current sources		2
L2. Voltage sources		2
L3. Non-inverting amplifier with AO		2
L4. Inverting amplifier with AO		2
L5. Differential circuit with AO		2
L6. Frequency characteristic of AO		2
L7. Output stages		2
L8. Summing amplifier		2
L9. Integration and derivation circuits		2
L10. Precision rectifiers		2
L11. Comparators. Applications		2
L12. Applications with E555		2
Recoveries and final verification		2
Bibliography		
A. Manolescu, A Manolescu - *Circuite integrate liniare (Culegere de probleme)* - Ed. Şt. şi Enc. Buc. 1987		
I. Gavriluț, L. Țepelea, A. Gacsadi, *Circuite integrate analogice - Îndr. de lab.*, Ed. Univ. din Oradea, 2018.		
M. Ciugudean, V. Tiponuţ, M. E. Tănase, I. Bogdanov, H. Cârstea, A. Filip, *Circuite integrate liniare. Aplicaţii*, Ed. Facla Timişoara, 1986.		
Paul R. Gray, Robert G. Meyer – *Circuite integrate analogice - Analiză şi proiectare* - Ed. Teh., Buc. 1998		
Lar Călin - *Circuite analogice - Îndrumător de laborator* - Ed. Univ. Oradea 2003		

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

The content of the discipline is in accordance with those taught at other universities in the country and abroad. The meetings of the university teachers with representatives of the professional associations and of the employers led to the adaptation of the analytical program to the specific requirements of the labor market. Also, the content of the analytical program of the discipline was debated with ARACIS members in various stages of the controls carried out.

10. Evaluation

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

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

Completion date:

25.09.2023

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Date of endorsement in the department:

27.09.2023

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:

29.09.2023

Dean,
Prof.dr.eng.habil. Francisc-Ioan HATHAZI
E-mail: francisc.hathazi@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/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Digital integrated circuits I**				
2.2 Holder of the subject			**Conf.dr.ing. Ovidiu NEAMȚU**				
2.3 Holder of the academic seminar/laboratory/project			**Conf.dr.ing. Ovidiu NEAMȚU**				
2.4 Year of study	II	2.5 Semester	3	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	3	3.3 academic seminar/laboratory/project	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14

Distribution of time	**33**
Study using the manual, course support, bibliography and handwritten notes	**10**
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	**8**
Tutorials	**3**
Examinations	**2**
Other activities.	

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector and internet access in the classroom, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the Covid pandemic situation
5.2.for the development of the academic	for each student, computer with internet access and electronic modules necessary for the laboratory, but also online on the e.uoradea.ro platform

seminary/laboratory/project	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. / 1 credit** **C2. Applying basic methods for the acquisition and processing of signals. / 1 credit** **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques. / 1 credit**
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	▪ Modern trends are to achieve complex logic integrated circuits that are encapsulated in a single chip. The internal architecture of the circuits plays a very important role in such a technology. The classic circuit structures for logic functions are presented. The applicative importance starts from a double aspect: the functional understanding in close dependence with the electrical values.
7.2 Specific objectives	▪ knowledge of the internal architecture of classical digital integrates and how to associate analog electrical values with binary logic states. ▪ implementation of electronic schemes with digital integrated circuits both in high level and experimental simulation through adequate operation with parametric testing.

8. Contents*

8.1 Course The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Data representation in digital systems	lecture, discussion and exemplification	2
2. Boolean algebra	lecture, discussion and exemplification	2
3. Logical gates	lecture, discussion and exemplification	2
3.1 Logic circuits in TTL technology	lecture, discussion and exemplification	2
3.2 Logic circuits in NMOS technology	lecture, discussion and exemplification	2
3.3 Logic circuits in CMOS technology	lecture, discussion and exemplification	2
3.4 Logic circuits in I2C technology	lecture, discussion and exemplification	2
3.5 Validation circuits in integrated architectures	lecture, discussion and exemplification	2
4. Karnaugh diagrams	lecture, discussion and exemplification	2
5. Encoders and decoders	lecture, discussion and exemplification	2
6. Multiplexers and demultiplexers	lecture, discussion and exemplification	2
7. Analysis of combinational logic circuits	lecture, discussion and exemplification	2
8. Synthesis of combinational logic circuits	lecture, discussion and exemplification	2
9. Applications with logic integrated circuits	lecture, discussion and exemplification	2

Bibliography

1. Ovidiu Neamţu, Laviniu Ţepelea, Circuite Integrate Numerice Editura Universităţii din Oradea, 2008.
2. D. Nicula, Electronică digitală – carte de învățătură 2.0, Editura Universității Transilvania din Brașov, 2015.
2. Tony R. Kuphaldt, Lessons In Electric Circuits, Volume IV . Digital, Fourth Edition,, 2007.
3. T. Mureșan, Circuite integrate numerice – aplicații, Editura de Vest, Timișoara, 1996
1. 4. I.Sztojanov, De la poarta TTL la Microprocesor, Ed. Tehnică, București, 1987

8.2 Academic seminar/laboratory/project The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Measurement of static and dynamic parameters at TTL and CMOS integrated circuits	experimentation	2

2. Implementation of logical functions	experimentation	2
3. Validation circuits for integrated logic architectures	experimentation	2
4. Logic encoders	experimentation	2
5. Multiplexers and demultiplexers	experimentation	2
6. Logic decoders and multiplexed display	experimentation	2
7. Stable with digital integrated circuits	experimentation	2

Bibliography

1. **Ovidiu Neamțu,** Alexandru Gacsadi, Laviniu Țepelea, E-Laboratorul 1, Aplicații ale unor circuite logice combinaționale "E-Laboratory Practical Teaching for Applied Engineering Sciences", EPRAS, 2011, http://epras.webhost.uoradea.ro/lab1.html
2. D. Nicula, Electronică digitală – carte de învățătură 2.0, Editura Universității Transilvania din Brașov, 2015
3. Tony R. Kuphaldt, Lessons In Electric Circuits, Volume IV . Digital, Fourth Edition,, 2007.
5. T. Mureșan, Circuite integrate numerice – aplicații, Editura de Vest, Timișoara, 1996
1. 6. Low-voltage logic, Data book, Texas Instruments, 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

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline Digital integrated circuits I, students acquire a consistent knowledge, in accordance with the required skills
- the course exists in the curriculum of Romanian universities and faculties
- the content of the course is appreciated by the companies that have as employees graduates of this course

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Note 5 The assessment criteria are based on the completeness and correctness of the knowledge, logical coherence, creativity. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, attendance at classes.	Written or online / testing theoretical and applied knowledge based on written work or paper.	70 %
10.6 Laboratory	Note 5 - performing laboratory work and demonstrating applied and theoretical skills. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, interest in individual	Oral or online / questions based on the applications made a percentage of 15.% of the final grade from the laboratory, is awarded for the successful completion of the individual study topic.	30%

	study, active participation.		
10.8 Minimum performance standard: Course: 5 Laboratory:5			

Completion date: 25.09.2023

Assoc.Prof.Dr.Ing. Ovidiu Marius Neamțu
E-mail: oneamtu@uoradea.ro

Date of endorsement in the department: 27.09.2023

Head of Department
Prof.Dr. Ing. Nistor Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board: 29.09.2023

Dean
Professor habil. Francisc - Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Digital integrated circuits II**				
2.2 Holder of the subject			**Conf.dr.ing. Ovidiu NEAMȚU**				
2.3 Holder of the academic seminar/laboratory/project			**Conf.dr.ing. Ovidiu NEAMȚU**				
2.4 Year of study	II	2.5 Semester	4	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD

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

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

Distribution of time	33
Study using the manual, course support, bibliography and handwritten notes	10
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	8
Tutorials	3
Examinations	2
Other activities.	

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector and internet access in the classroom, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the Covid pandemic situation
5.2.for the development of the academic	for each student, computer with internet access and electronic modules necessary for the laboratory, but also online on the e.uoradea.ro platform

seminary/laboratory/project	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. / 1 credit** **C2. Applying basic methods for the acquisition and processing of signals. / 1 credit** **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques. / 1 credit**
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 classic circuit structures for sequential logic functions are presented. The applicative importance starts from a double aspect: the functional understanding in close dependence with the electrical values.
7.2 Specific objectives	▪ functional application knowledge for classical and medium complexity integrated circuits: monostable, bistable, counting, registers, memories; ▪ implementation of electronic schemes with digital integrated circuits both in high level and experimental simulation through adequate operation with parametric testing.

8. Contents*

8.1 Course The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Circuits for sequential logic functions	lecture, discussion and exemplification	
1.1. RS bistable circuit	lecture, discussion and exemplification	2
1.2. JK type master-slave bistable circuit	lecture, discussion and exemplification	2
1.3. Type D flip-flop circuit	lecture, discussion and exemplification	1
1.4. T-type bistable circuit	lecture, discussion and exemplification	1
2. Counting	lecture, discussion and exemplification	
2.1. Asynchronous binary counters	lecture, discussion and exemplification	2
2.2. Synchronous binary counters	lecture, discussion and exemplification	2
2.3. Binary counters modulo "p".	lecture, discussion and exemplification	2
2.4. High capacity integrated counters	lecture, discussion and exemplification	2
3. Register	lecture, discussion and exemplification	
3.1 Memory registers	lecture, discussion and exemplification	1
3.2 Secvential registers	lecture, discussion and exemplification	1
3.3 Universal register	lecture, discussion and exemplification	2
3.4 Parallel-series and parallel series binary converter	lecture, discussion and exemplification	2
4. Monostable tilting circuits	lecture, discussion and exemplification	
4.1. Monostable switching circuits synthesized with logic gates	lecture, discussion and exemplification	1
4.2. Integrated monostable / astable tilting circuits	lecture, discussion and exemplification	1
5. Memory circuits	lecture, discussion and exemplification	
5.1. ROM memories	lecture, discussion and exemplification	1
5.2. PROM memories	lecture, discussion and exemplification	1
5.3. Random access RAM memories	lecture, discussion and exemplification	2
6. Integrated circuits in dedicated applications	lecture, discussion and exemplification	2
Bibliography		

1. Ovidiu Neamţu, Laviniu Ţepelea, Circuite Integrate Numerice Editura Universităţii din Oradea, 2008.
2. D. Nicula, Electronică digitală – carte de învățătură 2.0, Editura Universității Transilvania din Brașov, 2015.
2. Tony R. Kuphaldt, Lessons In Electric Circuits, Volume IV . Digital, Fourth Edition,, 2007.
3. T. Mureșan, Circuite integrate numerice – aplicații, Editura de Vest, Timișoara, 1996
1. 4. I.Sztojanov, De la poarta TTL la Microprocesor, Ed. Tehnică, București, 1987

8.2 Academic seminar/laboratory/project The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Flip flops SR, JK.	experimentation	2
2. Flip-flop circuits T, D.	experimentation	2
3. Integrated counters	experimentation	2
4. High-capacity counters.	experimentation	2
5. Memory and serial registers	experimentation	2
6. Electronic memories.	experimentation	2
7. Specialized integrated circuits - electronic clock.	experimentation	2

Bibliography

1. **Ovidiu Neamţu,** Alexandru Gacsadi, Laviniu Ţepelea, E-Laboratorul 1, Aplicaţii ale unor circuite logice combinaţionale "E-Laboratory Practical Teaching for Applied Engineering Sciences", EPRAS, 2011, http://epras.webhost.uoradea.ro/lab1.html
2. D. Nicula, Electronică digitală – carte de învățătură 2.0, Editura Universității Transilvania din Brașov, 2015
3. Tony R. Kuphaldt, Lessons In Electric Circuits, Volume IV . Digital, Fourth Edition,, 2007.
5. T. Mureșan, Circuite integrate numerice – aplicații, Editura de Vest, Timișoara, 1996
1. 6. Low-voltage logic, Data book, Texas Instruments, 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

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline Digital integrated circuits II, students acquire a consistent knowledge, in accordance with the required skills
- the course exists in the curriculum of Romanian universities and faculties
- the content of the course is appreciated by the companies that have as employees graduates of this course

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Note 5 The assessment criteria are based on the completeness and correctness of the knowledge, logical coherence, creativity. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, attendance at classes.	Written or online / testing theoretical and applied knowledge based on written work or paper.	70 %
10.6 Laboratory	Note 5 - performing laboratory work and demonstrating applied and theoretical skills. Note 10 - correct answer to all questions ensuring	Oral or online / questions based on the applications made a percentage of 15.% of the final grade from the laboratory, is awarded for the successful completion of	30%

	the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, interest in individual study, active participation.	the individual study topic.	
10.8 Minimum performance standard: Course: 5 Laboratory:5			

Completion date: 25.09.2023

Assoc.Prof.Dr.Ing. Ovidiu Marius Neamțu
E-mail: oneamtu@uoradea.ro

Date of endorsement in the department: 27.09.2023

Head of Department
Prof.Dr. Ing. Nistor Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board: 29.09.2023

Dean
Professor habil. Francisc - Ioan HATHAZI
E-mail: francisc.hathazi@gmail.com

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Electronics amd Telecomunications
1.4 Field of study	Electrical Engineering Technology, Telecomunications 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		Fundamentals of Electrical Engineering II					
2.2 Holder of the subject		**ARION MIRCEA NICOLAE**					
2.3 Holder of the academic seminar/laboratory/project		**ARION MIRCEA NICOLAE**					
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Ex-Exam Continuous Assessment	2.7 Subject regime	Domain Discipline

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	-/1/-
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	- /14/-
Distribution of time					33 hours
Study using the manual, course support, bibliography and handwritten notes					**10**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					**9**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**6**
Tutorials					**4**
Examinations					**4**
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

5.2.for the development of the academic seminary/laboratory/project	The seminar / laboratory can be held face to face or online The seminar discusses theoretical aspects of the course and their applications with personal contributions of students. The practical applications are made using the modern working means existing in the Electrical Engineering laboratory (DEGEM workstations, high-performance and current measuring devices, modeling software, etc.). Students come with the observed laboratory work Mandatory presence at all laboratories It is possible to recover during the semester 30% of the laboratory works;
6. Specific skills acquired	
Professional skills	C1. Use of fundamentals related to devices, circuits, systems, instrumentation and electronic technology C2. Application of basic methods for signal acquisition and processing C3. Application of basic knowledge, concepts and methods regarding computer system architecture, microprocessors, microcontrollers, programming languages and techniques
Transversal skills	

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

7.1 The general objective of the subject	▪ The course "Fundamentals of Electrical Engineering II " ensures the basic theoretical and practical technical training of students, presents electromagnetic phenomena in terms of applications in technology. It is a fundamental domain discipline that presents calculation methods of general interest, necessary to solve various problems specific to classical or modern electrical engineering. ▪ The discipline tries to form the following attitudinal competencies: manifestation of a positive and responsible attitude towards the scientific field / optimal and creative capitalization of one's own potential in scientific activities / involvement in promoting scientific innovations / engaging in partnerships with others / participation in own development professional
7.2 Specific objectives	▪ The course "Fundamentals of Electrical Engineering II " further presents elements of the theory of electrical circuits: the regime approach of electrical circuits (three-phase electrical circuits, linear electrical circuits in periodic non-sinusoidal mode, linear electrical circuits in transient mode) and specific methods of analysis of electrical circuits presented. The course continues with the presentation of the basic elements (quantities, units, general and material laws) of the macroscopic theory of electromagnetism, for understanding the technical applications of this theory. The study of the fundamental relations and electrostatic phenomena, of the electrokinetic regime and of the stationary regime of the magnetic field. Formulation of Maxwell's system of equations, which allows solving any field or circuit problem under certain specified conditions, and presenting applications of special importance in the electrical field. General laws of electrotechnics: Law of magnetic circuit, Law of electromagnetic induction, Maxwell's equations. ▪ The seminar applications aim to deepen the knowledge taught in the course: substantiation of the calculation methods of three-phase electrical circuits, linear electrical circuits in periodic non-sinusoidal regime, linear electrical circuits in transient regime, capacity calculation, electrostatic energy and electric field forces; to solve electromagnetic field problems. The activity at the seminar is focused on applications specific to the chapters taught in the course and aims to form calculation skills. Applications in the field of electrical circuits are, in most cases, situations that shape real circuits in technology. ▪ The laboratory activity is focused on applications specific to the chapters taught in the

	course and aims at the experimental verification of the basic relations for the encountered physical systems. The performance of laboratory works offers, in addition to the formation of skills in the electrical field, the use of physical and numerical modeling, sizing of assemblies, the correct use of measuring equipment, evaluation of errors in experimental determinations performed. Instruments: use of laboratory working methods, use of measurement techniques using the equipment provided, use of mathematical models for calculating errors, drawing graphs of variation and interpretation of the results obtained practically.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 4. PERMANENTLY SINUSOIDAL ELECTRICAL CIRCUITS Joubert's theorem in complex form for magnetically coupled circuits Kirchhoff's theorems, in complex, for magnetically coupled circuits	Video projector, slides and whiteboard. Interactive teaching	2
The power factor. Power factor compensation Constructive solutions regarding the power factor compensation	Video projector, slides and whiteboard. Interactive teaching	2
Complex representation of apparent power Maximum power transfer theorem Solving alternating current circuits in permanent sinusoidal regime Kirchhoff's theorem method. Algorithm. Features Cyclic current method. Algorithm. Features	Video projector, slides and whiteboard. Interactive teaching	2
Node potential method. Algorithm. Features Transfiguration theorems. Transfiguration of series connected circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Transfiguration of parallel connected circuits. Resonance phenomena in alternating current circuits Voltage resonance. Current resonance	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 5. THREE-PHASE ELECTRICAL CIRCUITS Three-phase circuits and systems. Overview Production of a symmetrical three-phase system of electromotive voltages Three-phase circuit connections. Star connection of three-phase circuits.	Video projector, slides and whiteboard. Interactive teaching	2
Triangle connection of three-phase circuits Three-phase star-connected receivers with neutral conductor Three-phase star-connected receivers without neutral conductor Three-phase circuits connected in a triangle Three-phase circuits powered by three-phase asymmetric	Video projector, slides and whiteboard. Interactive teaching	2

voltage systems Electrical power in three-phase electrical circuits		
CHAPTER 6. LINEAR ELECTRICAL CIRCUITS IN PERIODIC NON-SINUSOIDAL REGIME Periodic non-sinusoidal regime. Generalities. Decomposition of periodic functions into Fourier series Actual and average values of periodic functions. Coefficients characteristic of periodic functions	Video projector, slides and whiteboard. Interactive teaching	2
Analysis of electrical circuits in permanent non-sinusoidal regime by decomposition into harmonics Non-sinusoidal terminal voltage resistor Voltage coil at non-sinusoidal terminals Live capacitor at non-sinusoidal terminals RLC circuits live at non-sinusoidal terminals Powers in non-sinusoidal regime	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 7. LINEAR ELECTRICAL CIRCUITS IN TRANSITORY REGIME Generalities. The direct method RL series circuits in transient mode. The direct method RC series circuits in transient mode. The direct method	Video projector, slides and whiteboard. Interactive teaching	2
Laplace transform method Laplace transforms. Laplace transform theorems Some details regarding the application of the Laplace transform in the study of electrical circuits	Video projector, slides and whiteboard. Interactive teaching	2
Operational form of electrical circuit equations. Operational impedances Networks in null initial conditions Networks in non-zero initial conditions	Video projector, slides and whiteboard. Interactive teaching	2
CHAPTER 8. ELEMENTS OF QUADRIPOLE THEORY Definitions. classification The equations of the diport quadripole The transition from one system of quadripole equations to another Interconnection of quadrupoles	Video projector, slides and whiteboard. Interactive teaching	2
Equivalent schemes of the quadrupole Empty and short-circuit testing of the quadripole The characteristic impedance and propagation constant of the symmetrical quadripole Electric frequency filters	Video projector, slides and whiteboard. Interactive teaching	2

Bibliography

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

8.2 Seminary	Teaching methods	No. of hours/ Observations
8.2 Laboratory	Teaching methods	No. of hours/

		Observations
Lab presentation. Theoretical notions of health and safety protection during practical activities from the laboratory	Aspects regarding the norms of health and safety protection during work in the electrical engineering laboratory are presented and discussed. The circuit elements, the measuring devices are presented	2
Study of capacitive circuits in alternating current.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Study of inductive circuits in alternating current.	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Study of RC circuits in alternating current. Study of RL circuits in alternating current	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Resonance of RLC circuits in alternating current	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Modeling of Laplacian fields by electrical networks	With the help of DEGEM modules and measuring devices, the work with the same title is completed	2
Verification of knowledge,	Verification test	2

Bibliography

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

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-	Written examination	60 %
10.6 Seminary	-	Knowledge assessment test	20 %
10.6 Laboratory	-	Knowledge assessment test	20 %

10.8 Minimum performance standard:

- Carrying out works and applications, in order to solve some problems specific to the electrical circuits, with the correct evaluation of the existing situation, of the available resources, in

	conditions of application and correct realization of the norms of safety and health at work. Principle of operation and composition of electrical circuits. Understanding electromagnetic phenomena

Completion date:
28.08.2023

Date of endorsement in the department:
29.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	**Computer aided graphics**						
2.2 Holder of the subject	Prof.dr.ing. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Conf.dr.ing. Ioan Buciu						
2.4 Year of study	II	2.5 Semester	3	2.6 Type of evaluation	Vp	2.7 Subject regime	FD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic laboratory	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time (in hours)					44
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Computer programming and programming languages
4.2 related to skills	

5. Conditions (where applicable)

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

6. Specific skills acquired

Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** • Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers • Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. • Carrying out projects that involve hardware components (processors and software components (programming).
Transversal skills	**CT1.** The methodical analysis of problems encountered in activity, identifying the elements for which consecrated solutions exist, thus ensuring the fulfilment of professional tasks. **CT2.** Defining activities on stages and their distribution to subordinates, with the complete explanation of duties, depending on the hierarchy levels, thus ensuring the efficient exchange of information and interpersonal communication.

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

7.1 The general objective of the subject	▪ The general objective of this discipline is to familiarize students with the specific concepts of computer-assisted graphics in electronics starting from Graphic Systems, Coordinate Systems, Two-Dimensional Graphic Transformations, Projections, Visualization Transformations and Reflection and Lighting Models.
7.2 Specific objectives	• The specific objectives of this discipline are to develop students 'knowledge of Graphic Systems and Coordinate Systems used in computer-aided graphics in electronics as well as to develop students' skills to implement algorithms in the field of two-dimensional graphical transformations, projections, visualization transformations. and Reflection and Lighting Models.

8. Contents*

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

Bibliography:

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

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

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

Bibliography

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

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

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

10. Evaluation

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

Completion date:
26.09.2023

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:
27.09.2023

Signature Departament Directory

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

Date of endorsement in the Faculty Board:
29.09.2023

Dean's Signature

prof.dr.ing. Francisc Ioan Hathazi
ihathazi@uoradea.ro, https://prof.uoradea.ro/ihathazi/

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		**Computer aided graphics- project**					
2.2 Holder of the subject							
2.3 Holder of the academic seminar/laboratory/project		Prof.dr.ing. Cristian Grava					
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	VP	2.7 Subject regime	FD

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

3.1 Number of hours per week	2	of which: 3.2 course	-	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	-	3.6 academic seminar/laboratory/project	28
Distribution of time (in hours)					22
Study using the manual, course support, bibliography and handwritten notes					6
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					8
Tutorials					-
Examinations					2
Other activities.					-

3.7 Total of hours for individual study	**22**
3.9 Total of hours per semester	**50**
3.10 Number of credits	**2**

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

Bibliography

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

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

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

10. Evaluation

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

Completion date:
26.09.2023

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

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

Date of endorsement in the department:
27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Dean's Signature
prof.dr.ing. Francisc Ioan Hathazi
ihathazi@uoradea.ro, https://prof.uoradea.ro/ihathazi/

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	**Measurements in Electronics and Telecommunications**						
2.2 Holder of the subject	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.3 Holder of the academic seminar/laboratory/project	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DD

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

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	3
Examinations	5
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Mathematical Analysis, Physics, Electronic devices, Fundamentals of Electrical Engineering
4.2 related to skills	Competences corresponding to the first year of preparation for the license in Applied Electronics

5. Conditions (where applicable)

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

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

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

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

8. Contents*

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

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

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

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

10. Evaluation

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

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

Completion date
05.09.2023

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

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

Date of endorsement in the department:
27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Signature of the Dean
Prof.dr.ing. Ioan Francisc Hathazi
francisc.hathazi@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 Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**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					11
Study using the manual, course support, bibliography and handwritten notes					
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					2
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					5
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**11**
3.9 Total of hours per semester	**25**
3.10 Number of credits	**1**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	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,	1h

	on the board or 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:

29.08.2023

Signature of the discipline holder

Abrudan Caciora Simona Veronica
e-mail: veronicaabrudan@yahoo.com

Date of endorsment in the department:

18.09.2023

Signature of the Head of the Department

Prof.univ.dr.ing. Helga Silaghi
e-mail: hsilaghi@uoradea.ro

Date of endorsement in the department

27.09.2023

Signature of the Head of the Department

Prof. univ. dr. ing. Daniel Nistor Trip
e-mail: dtrip@uoradea.ro

Date of endorsement in the

Signature of the Dean

Faculty Board: Prof.univ.dr.ing.inf.habil. Francisc – Ioan Hathazi

Date de contact:

e-mail: ihathazi@uoradea.ro

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Control Systems Engineering and Management**
1.4 Field of study	**Control systems engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**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					11
Study using the manual, course support, bibliography and handwritten notes					
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					2
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					5
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**11**
3.9 Total of hours per semester	**25**
3.10 Number of credits	**1**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	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,	1h

	on the board or 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, Bențea 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:

29.08.2023

Signature of the discipline holder

Abrudan Caciora Simona Veronica
e-mail: veronicaabrudan@yahoo.com

Date of endorsment in the department:

18.09.2023

Signature of the Head of the Department

Prof.univ.dr.ing. Helga Silaghi
e-mail: hsilaghi@uoradea.ro

Date of endorsement in the department

27.09.2023

Signature of the Head of the Department

Prof. univ. dr. ing. Daniel Nistor Trip
e-mail: dtrip@uoradea.ro

Date of endorsement in the

Signature of the Dean

Faculty Board: Prof.univ.dr.ing.inf.habil. Francisc – Ioan Hathazi

Date de contact:

e-mail: ihathazi@uoradea.ro

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		Numerical Methods					
2.2 Holder of the subject		Lecturer PhD eng. **Novac Cornelia Mihaela**					
2.3 Holder of the academic seminar/laboratory/project		Lecturer PhD eng. **Novac Cornelia Mihaela**					
2.4 Year of study	2	2.5 Semester	4	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	DF

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

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

Distribution of time	30 hours
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**30**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

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

6. Specific skills acquired	
Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Using electronic instruments and specific methods for characterizing and evaluating the performance of certain electronic circuits and systems. **C2. Applying basic methods for the acquisition and processing of signals:** - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis. **C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used.
Transversal skills	

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

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

8. Contents*

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

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

Bibliography

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

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

Bibliography

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

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

3. Numerical methods to solve algebric linear systems equations. Exact methods. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
4. Numerical methods to solve algebric linear systems equations. Iterativet methods .Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
5. Numerical methods to solve nonlinear equations. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
6. Interpolation. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	4
7. Functions approximation. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
8. Numerical integration. Applications.	Free presentation, with exemplification on the board. Interactive method.	2
9. Numerical derivation. Applications.	Free presentation, with exemplification on the board. Interactive method.	2
10. Numerical methods to solve differential equations. Examples and applications.	Free presentation, with exemplification on the board. Interactive method.	2
11. Evaluation		2

Bibliography

1. Mihaela Novac-“ Metode numerice”, Editura Universităţii din Oradea, 2005.
2. Mihaela Novac, O. Novac - “Metode numerice utilizând Matlab”, Editura Universităţii din Oradea, 2003.
3. Mihaela Novac - “Metode numerice îndrumător de laborator”, Editura Universităţii din Oradea, 2012.
4. M. Ghinea, V. Fireţeanu, - “ Matlab calculul numeric-grafică-aplicaţii.”, Editura Teora, 1997.
5. I.A Viorel,D. M. Ivan – “Metode numerice cu aplicaţii în ingineria electrică”, Editura Universităţii din Oradea, 2000.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark

10.4 Course	Knowledge and proper use of notions specific to numerical calculation;	Continuous Assessment, practical computer applications / Online assessment (Online questionnaire)	70 %
10.5 Seminar	Realization of all seminar applications	Continuous testing of the theory throughout the semester	15%
10.6 Laboratory	Realization of all laboratory applications	Practical application	15 %
10.8 Minimum performance standard:			

Completion date:
28.08.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject			Object oriented programming				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	II	2.5 Semester	4	2.6 Type of the evaluation	Continuous Assessment	2.7 Subject regime	FD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14
Distribution of time					33
Study using the manual, course support, bibliography and handwritten notes					9
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					18
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					3
Tutorials					-
Examinations					3
Other activities.					-

3.7 Total of hours for individual study	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	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, 1999, 2007
3. M. Curila S. Curila, "*Programarea in C şi C ++*", Editura Universităţii din Oradea, 2008, 300 pagini, ISBN 978-973-759-554
4. Bjarne Stroustrup, C++ Programming Language, Editura Pearson Education, ianuarie 2013
5. R.-D. Albu, M. Curilă, S. Curilă, "Programarea în C ++ Indrumator de laborator", ediția 2 revizuită pentru CD, Editura Universităţii din Oradea, 2020, 152 pagini, ISBN 978-606-10-2118-5

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. Bjarne Stroustrup, C++ Programming Language, Editura Pearson Education, ianuarie 2013
4. R.-D. Albu, M. Curilă, S. Curilă, "Programarea în C ++ Indrumator de laborator", ediția 2 revizuită pentru CD, Editura Universităţii din Oradea, 2020, 152 pagini, ISBN 978-606-10-2118-5

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. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course. The activity can also be carried out online.	written	80%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2023

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

Date of endorsement in the department:
27.09.2023

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:
29.09.2023

Dean,
Prof.univ.dr. habil. Francisc Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**SPICE MODELS**					
2.2 Holder of the subject		Șchiop Adrian					
2.3 Holder of the academic seminar/laboratory/project		Șchiop Adrian					
2.4 Year of study	2	2.5 Semester	4	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD

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

3.1 Number of hours per week	4	of which: 3.2 course	4	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	30
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	7
Tutorials	2
Examinations	2
Other activities.	0

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C1. Using the fundamental elements referring to electronic devices, circuits, systems, instrumentation and technology:** - Describing the functioning of electronic devices and circuits and of the fundamental methods for measuring electric dimensions. - Designing and implementing electronic circuits of low/average complexity using CAD_CAM technologies, as well as the standards applied in the domain. **C2. Applying basic methods for the acquisition and processing of signals:** - Using simulation environments for the analysis and processing of signals. - Using specific methods and instruments for signal analysis.
Transversal skills	

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

7.1 The general objective of the subject	▪ Knowledge of the types of analyses that can be carried out in the OrCAD environment; ▪ Making printed circuit board for different electronic circuits; ▪ Knowing the significance of the model parameters of the usual electronic devices; ▪ Use of the catalog parameters of electronic devices to determine their model parameters;
7.2 Specific objectives	▪ The ability to perform and simulate an electronic scheme in the OrCAD environment ▪ The ability to design printed circuit board in PCB Editor.

8. Contents*

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

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

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

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard The exam note contains an electronic scheme of medium complexity. Students will simulate the operation of the respective scheme and will achieve its wiring - Clarity, consistency, concision of presentation and explanation of subjects For 10: Total solving of the exam subject	Computer exam	60%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): Verification at the end of each laboratory hour of the accuracy of the results obtained by simulation		10%

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

Completion date:
15.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

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

(I) Imposed; (O) Optional;

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 laboratory	1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 laboratory	14
Distribution of time					58 hours
Study using the manual, course support, references and handwritten notes					18
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					-
Examinations					12
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	video projector, laptop, smart board
5.2.for the development of the academic laboratory	The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students with the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	**C1. Use of basic elements related to electronic devices, circuits, systems, instrumentation and technology** **C2. Application of basic methods for signal acquisition and processing.** **C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques.**
Trans-versal skills	

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

7.1 General objective of the subject	• The course is taught to second year students *Applied Electronics*. The course addresses notions that will allow future graduates to use the fundamentals of electronic, telecommunications devices, circuits and instrumentation needed for signal analysis, processing and synthesis, to characterize

	time and frequency signals and to use methods and tools. specific for the analysis and synthesis of signals, continuous or discrete, periodic or aperiodic.
7.2 Specific objectives	- Use of simulation media (Matlab) for analog or digital analysis and processing of signals. - Ability to develop programs in an object-oriented programming language, starting from the specification of requirements and to the execution, debugging and interpretation of results. - Developing a positive attitude towards the activities of assimilating new professional knowledge and information, cultivating and promoting a scientific environment focused on values, forming a positive and responsible professional behavior.

8. Contents*

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

References

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

8.2 Seminar	Teaching methods	No.of hours/ Observations
8.3 Laboratory (on site/ on-line)		
1. Continuous periodical signals spectral analysis.	Practical application. Discussions	2 hours
2. Continuous aperiodical signals spectral analysis.	Practical application. Discussions	2 hours
3. Harmonic carrier amplitude modulated signals. Product amplitude modulation,	Practical application. Discussions	2 hours
4. Harmonic carrier frequency and phase modulated signals.	Practical application. Discussions	2 hours
5. Sampled signals spectral analysis.	Practical application. Discussions	2 hours
6. Impulse modulated signals spectral analysis.	Practical application. Discussions	2 hours
7. Recovery of laboratories. Ending the school situation.	Practical application. Discussions	2 hours
8.4 Project		

References

1 **Semnale şi Sisteme I**, *C.Gordan, R.Reiz,* Îndrumător de laborator, Editura Universităţii din Oradea 2017.
2. **Semnale şi Sisteme**, *Al.Isar, C.Gordan., I.Naforniţă*,Editura Orizonturi Studenţeşti Timişoara 2006,ISBN 973-638-324-9

3 **Analiza şi sinteza semnalelor**, *C.Gordan, R.Reiz,* Editura Universităţii din Oradea 2008, ISBN 978-973-759-642-0.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Cours	For 10: Active participation in the developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basics on all topics covered.	Oral or written evaluation, online or on-site. Discussions. Argue.	60 %
10.5 Seminar	-	-	-
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the requirements imposed by all laboratory works. Well-documented arguments. Reading the required bibliography. A percentage of 15% of the final grade at the laboratory is awarded for the successful completion of all the topics provided for individual study.	Written test. Practical test. Discussions. Online or on-site argumentation	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: **Laboratory**: obtaining a 5 grade in each laboratory testparticipation and fulfillment of all requirements imposed by each laboratory work; minimum knowledge regarding the temporal and spectral analysis of some continuous periodic or aperiodic signals, of some MA, MF, MP signals, of some simple sampled signals, respectively of the discrete amplitude modulated signals. **Cours:** obtaining a 5 grade in each course test, as an arithmetic mean of the grades obtained for this type of activity. Knowledge of the basic notions regarding the analysis and synthesis of continuous periodic or aperiodic signals (Fourier series, Fourier and Laplace transforms), of modulated signals with harmonic carrier MA, MF, MP, of sampled and discrete signals, respectively of modulated pulses MIA, MIF, MIP , MID.		

Completion date: 06.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

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

(I) Imposed; (O) Optional;

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3seminar/laboratory	1/1
3.4 Total of hours from the curriculum	56	of which: 3.5course	28	3.6seminar/laboratory	14/14
Distribution of time					44 hours
Study using the manual, course support, references and handwritten notes					12
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					-
Examinations					8
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	video projector, laptop, smart board
5.2.for the development of the academic laboratory	The existence of the apparatus and equipment necessary for the development in optimal conditions of the works provided in the discipline file. Providing students with the laboratory guide in printed or electronic format.

6. Specific skills acquired	
Professional skills	**C1. Use of basic elements related to electronic devices, circuits, systems, instrumentation and technology** **C2. Application of basic methods for signal acquisition and processing** **C3. Application of basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques.**
Trans-versal skills	

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

7.1 General objective of the subject	• The course is taught to second year students *Applied Electronics*. The course addresses notions that will allow future graduates to use the fundamentals of electronic, telecommunications devices, circuits and instrumentation needed for signal analysis, processing and synthesis, to design passive filters (k constant, m derived, bridge, composed), II order active (single and multiple reaction, ordered voltage source) or digital.

7.2 Specific objectives	- Use of simulation media (Matlab) for analog or digital analysis and processing of signals. - Design of basic functional blocks for analog and digital signal processing - Ability to develop programs in an object-oriented programming language, starting from the specification of requirements and to the execution, debugging and interpretation of results. - Developing projects including hardware (processors) and software (programming) components. - Developing a positive attitude towards the activities of assimilating new professional knowledge and information, cultivating and promoting a scientific environment focused on values, forming a positive and responsible professional behavior.

8. Contents*

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

References

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

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

References

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

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

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

in the industrial area of the city.

10. Evaluation

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

Completion date: 08.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		Information transmission theory					
2.2 Holder of the subject		Lect. PhD. Eng. MORGOŞ FLORIN LUCIAN					
2.3 Holder of the academic seminar/laboratory/project		Lect. PhD. Eng. MORGOŞ FLORIN LUCIAN					
2.4 Year of study	II	2.5 Semester	IV	2.6 Type of the evaluation	EX	2.7 Subject regime	DD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic laboratory	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time					58hours
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					-
Examinations					8
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online
5.2.for the development of	The laboratory can take place face to face or online. The existence of the

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

6. Specific skills acquired

Professional skills

C2. Applying basic methods for the acquisition and processing of signals:

- The temporal, spectral and statistic characterization of signals.
- Explaining and interpreting methods for the acquisition and processing of signals.
- Using simulation environments for the analysis and processing of signals.
- Using specific methods and instruments for signal analysis.
- Designing elementary functional blocks for the digital processing of signals with hardware and software implementation.

C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:

- Describing the functioning of a computer system, of the basic principles applied for general-use microprocessor and microcontroller architecture, of the general principles of structured programming.
- Using some general-use and specific programming languages for applications with microprocessors and microcontrollers; explaining the functioning of automated control systems that use such architectures and interpreting experimental results.
- Solving concrete, practical problems that include elements of data-structures and algorithms, programming and the use of microprocessors and microcontrollers.
- Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used.
- Carrying out projects that involve hardware components (processors and software components (programming).

C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:

- Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture.
- Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture.
- Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods.
- Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems.
- The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software.

Transversal skills	

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

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

8. Contents*

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

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

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

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

10. Evaluation

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

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

10.8 Minimum performance standard:

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

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

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

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

Contacts:
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:
5.09.2023

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

Date of endorsement in the department:
27.09.2023

Signature of the Dean
Prof. dr. eng.habil. Francisc – Ioan Hathazi
E-mail: ihathazi@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

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		**Architecture of computing systems**					
2.2 Holder of the subject		**Conf.dr.ing. Ovidiu Marius NEAMȚU**					
2.3 Holder of the academic seminar/laboratory/project		**Conf.dr.ing. Ovidiu Marius NEAMȚU**					
2.4 Year of study	III	2.5 Semester	6	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	**33**
Study using the manual, course support, bibliography and handwritten notes	**10**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	**10**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**8**
Tutorials	**3**
Examinations	**2**
Other activities.	

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector and internet access in the classroom, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the Covid pandemic situation
5.2.for the development of the academic	for each student, computer with internet access and electronic modules necessary for the laboratory, but also online on the e.uoradea.ro platform

seminary/laboratory/project	and the Microsoft Teams program, depending on the situation of the Covid pandemic

6. Specific skills acquired

Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics. / 1 credit** **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility. / 1 credit** **C6. Solving technological problems in the fields of applied electronics. / 1 credit**
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 objectives are focused on acquiring the terminology and the principles of connecting computers in the network, of communication protocols; understanding how the client-server works and the connection topologies for networks.
7.2 Specific objectives	▪ knowledge of hardware components for the computer network; ▪ knowledge of software implementations for networks; computers ▪ knowledge of how to protect data transmitted in computer networks.

8. Contents*

8.1 Course The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Block structure of PC computers	lecture, discussion and exemplification	2
2. Soft driver for managing the electronics in the motherboard	lecture, discussion and exemplification	2
3. Communications between internal components of PC systems	lecture, discussion and exemplification	2
4. The chipset in the architecture of evolved PC systems	lecture, discussion and exemplification	2
5. External communications with other PC systems	lecture, discussion and exemplification	2
6. Software configurations for direct electronic actions in Matlab-Simulink	lecture, discussion and exemplification	2
7. Internal architecture of Intel processors	lecture, discussion and exemplification	2
8. Complex instructions built into modern processors	lecture, discussion and exemplification	2
9. Memory organization	lecture, discussion and exemplification	2
10. High-capacity electronic storage units	lecture, discussion and exemplification	2
11. Communications in computer networks	lecture, discussion and exemplification	2
12. The graphic interface	lecture, discussion and exemplification	2
13. Application extensions for a computer	lecture, discussion and exemplification	2
14. Maintaining the hardware and software integrity of PC systems	lecture, discussion and exemplification	2
Bibliography **1. O. Neamţu,** Arhitectura Calculatoarelor, Ed. Universităţii din Oradea, 2008 **2. O. Neamţu,** Testarea calculatoarelor - Depanare experimentală, Ed. Universităţii din Oradea, 2002 3. Muntenu, s.a..Reţele Windows, Ed. Polirom, Bucureşti, 2004. 4. Tanenbaum A.S, Computer Networks, Prentice Hall PTR, 2005		
8.2 Academic seminar/laboratory/project The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. PC analysis software.	experimentation	2
2. Configuring the BIOS software	experimentation	2
3. Functional testing of the electronic modules of a PC	experimentation	2

with performance evaluation.		
4. Analysis of a processor - functional evaluation and comparisons based on performance criteria.	experimentation	2
5.. Analysis of a chipset with interfaced modules	experimentation	2
6. Programming in Matlab-Simulink for electronic input/output modules.	experimentation	2
7. Interfaces – USB, PCIe in electronic applications and data transfer.	experimentation	2
Bibliography **1. O. Neamţu,** Arhitectura Calculatoarelor, Ed. Universităţii din Oradea, 2008 **2. O. Neamţu,** Testarea calculatoarelor - Depanare experimentală, Ed. Universităţii din Oradea, 2002 3. Muntenu, s.a..Reţele Windows, Ed. Polirom, Bucureşti, 2004. 4. Tanenbaum A.S, Computer Networks, Prentice Hall PTR, 2005		

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

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline of Architecture of computing systems, students acquire a consistent knowledge, in accordance with the required skills
- the course exists in the curriculum of Romanian universities and faculties
- the content of the course is appreciated by the companies that have as employees graduates of this course

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Note 5 The assessment criteria are based on the completeness and correctness of the knowledge, logical coherence, creativity. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, attendance at classes.	Written or online / testing theoretical and applied knowledge based on written work or paper.	70 %
10.6 Laboratory	Note 5 - performing laboratory work and demonstrating applied and theoretical skills. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, interest in individual study, active participation.	Oral or online / questions based on the applications made a percentage of 15.% of the final grade from the laboratory, is awarded for the successful completion of the individual study topic.	30%

10.8 Minimum performance standard: Course: 5 Laboratory:5			

Completion date: 25.09.2023

Assoc.Prof.Dr.Ing. Ovidiu Marius Neamțu
E-mail: oneamtu@uoradea.ro

Date of endorsement in the department: 27.09.2023

Head of Department
Prof.Dr. Ing. Nistor Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board: 29.09.2023

Dean
Professor habil. Francisc - Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Electrical drives**					
2.2 Holder of the subject		**Lect. PhD eng. Viorica Spoială**					
2.3 Holder of the academic laboratory		**Lect. PhD eng. Viorica Spoială**					
2.4 Year of study	**III**	2.5 Semester	**5**	2.6 Type of the evaluation	**VP**	2.7 Subject regime	**DS**

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

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

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

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of electrotechnics, electrical machines, electronics, electrical measurements
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses
5.2.for the development of the academic laboratory	- Mandatory presence at all laboratories; - Students come with the observed laboratory works - A maximum of 2 works can be recovered during the semester (30%);

	- The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	**C4.** Designing and using some hardware and software applications of reduced complexity, specific to applied electronics **C5.** Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility **C6.** Solving technological problems in the fields of applied electronics
Transversal skills	

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

7.1 The general objective of the subject	• The discipline has as objective the students familiarization with the field of electrical drives, regarding the structure, the working principle and the electronic control of different types of electrical drives (with DC, AC, stepper, linear, piezoelectric motors).
7.2 Specific objectives	• Identification and optimization of the hardware and software solutions connected with electrical drives. • Defining specific elements that individualize the electronic equipments and circuits used in the field of electrical drives • Qualitative and quantitative interpretation of the circuits functioning in the electrical drives • Elaboration of the technical specifications, installing and exploiting of the equipments used in the field of electrical drives. • Explanation and interpretation of the production processes and of the maintenance activities for electronic devices, in order to identify the testing points and the measuring electrical quantities in the field of electrical drives. • Management principles application for the production activities organization from the technological point of view, exploitation and service in the field of electrical drives.

8. Contents*

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

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

Bibliography

1. Spoială Viorica, **Acționări electrice**, electronic course, 2022
2. Spoială Viorica, Spoială D., **Sisteme de acţionare electrică-probleme fundamentale**, Litografia Universităţii din Oradea, 2002
3. Silaghi H., Maghiar T., Spoială Viorica, **Acţionări electrice-probleme fundamentale şi noţiuni de proiectare**, Ed. Universităţii din Oradea, 2002
4. Iancu V., Spoială D., Spoială Viorica, **Maşini electrice şi sisteme de acţionări electrice**, vol.II, Ed. Universităţii din Oradea, 2006
5. Richard Crowder, **Electric drives and electromechanical systems**, Elsevier, Great Britain, 2006
6. Viorica Spoială, Helga Silaghi, **Acţionări electrice speciale**, Editura Universităţii din Oradea, 2010
7. Helga Silaghi, Viorica Spoială, Dragoş Spoială, **Acţionări electrice avansate**, Editura Universităţii din Oradea, 2019

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms and of the conventional signs specific to the field of electric drives. Comutation and protection devices used in electrical drives. Types of electric schemes used in electric drives.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher	2 h
2. Methods and schemes for starting electrical drives with DC motors. Matlab/Simulink simulation of transient processes in DC motors electrical drives.		2 h
3. Speed control of DC motors electrical drives supplied by PWM converters.		2 h
4. Speed control of induction motors electrical drives supplied by frequency converters.		2 h
5. Digital control of electrical drives with permanent magnet synchronous motors, using Unidrive M700		2 h
6. Microcontroller control of stepper motors electrical drives.		2 h
7. Recoveries and closing the situation at the laboratory.		2 h
Total		**14 h**

Bibliography

1. Viorica Spoială, Helga Silaghi, Dragoş Spoială – **Acţionări electrice**. Indrumător de laborator. Universitatea din Oradea, ISBN 978-606-10-1432-3, Ediţie CD-ROM, 140 pag, 2014
2. Viorica Spoială, **Acționări electrice**, electronic laboratory guidance, 2022

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

- The content of the discipline can be found in the curriculum of Applied Electronics of other university centers that have accredited these specializations and knowledge of all the types of electric drives and their operation and design is an important requirement of employers in the field (Nidec, Comau, Faist Mekatronics, Celestica, GMAB, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (grade 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Written verification during the semester** There are 2 verifications during the semester. The subjects are divided in 2 parts. For each of them the verification consists of a quiz with questions of theory and applications from all the courses. The final mark is calculated as the mean of the 2 marks obtained from the both verifications.	60 %
10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard recognition of the stands used to carry out the laboratory works, without presenting details on them For 10: detailed knowledge of how to perform all laboratory work	**Test + practical application** Each student receives a grade for laboratory work during the semester and for the laboratory work file. This results in an average for the laboratory.	40%
10.6 Minimum performance standard:			

Course:

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

Laboratory:

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

Completion date:
15.09.2023

Date of endorsement in the department:
18.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		**Basics of Data Acquisition Systems**					
2.2 Holder of the subject		**Lect. dr. eng. Țepelea Laviniu**					
2.3 Holder of the academic seminar/laboratory/project		**Lect. dr. eng. Țepelea Laviniu**					
2.4 Year of study	III	2.5 Semester	5	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	-/2/-
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					69h
Study using the manual, course support, bibliography and handwritten notes					21
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					20
Tutorials					
Examinations					8
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

Bibliography

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

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

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

Bibliography

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

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

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

-

10. Evaluation

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

Completion date:
16.09.2023

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:
27.09.2023

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

Date of endorsement in the Faculty Board:

29.09.2023

Dean,
Prof. dr. eng. habil. Francisc - Ioan Hathazi
francisc.hathazi@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 / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Power Electronic Converters**				
2.2 Holder of the subject			**Conf.dr.ing. Ovidiu Marius NEAMȚU**				
2.3 Holder of the academic seminar/laboratory/project			**Conf.dr.ing. Ovidiu Marius NEAMȚU**				
2.4 Year of study	III	2.5 Semester	6	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					**33**
Study using the manual, course support, bibliography and handwritten notes					**10**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					**10**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**8**
Tutorials					**3**
Examinations					**2**
Other activities.					
3.7 Total of hours for individual study	**33**				
3.9 Total of hours per semester	**75**				
3.10 Number of credits	**3**				

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector and internet access in the classroom, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the Covid pandemic situation
5.2.for the development of the academic	for each student, computer with internet access and electronic modules necessary for the laboratory, but also online on the e.uoradea.ro platform

seminary/laboratory/project	and the Microsoft Teams program, depending on the situation of the Covid pandemic

6. Specific skills acquired

Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics. / 1 credit** **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility. / 1 credit** **C6. Solving technological problems in the fields of applied electronics. / 1 credit**
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 and laboratory focus on the power electronics used in interaction with digital command generation systems. Modern electronic switches are interfaced with DSP-controller systems or computers equipped with specialized boards. ▪ Electronic converters are the solution in capturing renewable energy. The adaptation of a converter to imposed requirements is developed by simulation modeling, followed by an electronic implementation.
7.2 Specific objectives	▪ knowledge of the structures of electronic power converters ▪ knowledge of modern electronic interfaces for DSP, PC; ▪ implementation of electronic power converters for both proper and efficient operation.

8. Contents*

8.1 Course The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Electronic power converters - efficiency and performance criteria.	lecture, discussion and exemplification	2
2. Power factor and line current harmonics for rectifiers.	lecture, discussion and exemplification	2
3. DC-AC converters used to capture renewable energy	lecture, discussion and exemplification	2
4. AC-DC converters used to capture renewable energy	lecture, discussion and exemplification	2
5. DC voltage variators	lecture, discussion and exemplification	2
6. Optoelectronic interfaces for the transfer of signals to the power modules of electronic converters.	lecture, discussion and exemplification	2
7. Converters controlled from PC with Simulink-Matlab	lecture, discussion and exemplification	2
8. Simulink simulation and configuration for real-time control and operation.	lecture, discussion and exemplification	2
9. Converters for wind farms	lecture, discussion and exemplification	2
10. Converters for solar power plants	lecture, discussion and exemplification	2
11. Converters for geothermal power plants	lecture, discussion and exemplification	2
12. Expert systems, fuzzy logic, neural networks used in a.c. motor control.	lecture, discussion and exemplification	2
13. DSP for driving electronic converters.	lecture, discussion and exemplification	2
14. Operating a BLAC motor with DSP.	lecture, discussion and exemplification	2

Bibliography

1. O. Neamţu, Convertoare electronice de putere – Simulare şi interfaţare PC, Ed. Universităţii din Oradea, 2005.

2. O. Neamţu, Convertoare electronice de putere pentru alimentarea motoarelor de curent alternative, Ed. Universităţii din Oradea, 2002.

3. Bogdanov, Microprocesorul in comanda acţionarilor electrice, Ed. Facla, Timişoara, 1989. 4. A. Kelemen, M Imecs, Electronica de putere, E.D.P. Bucureşti, 1981.		
8.2 Academic seminar/laboratory/project The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Converter a.c. - d.c. - a.c.	experimentation	2
2. Digital electronic interfaces for power modules in converters.	experimentation	2
3. Electronic converter for renewable energy capture with MPPT (Maximum Power Point Tracking).	experimentation	2
4. Direct conversion of thermal energy into electricity, by charging a Li-Ion battery.	experimentation	2
5. Groundmed-Oradea power converter monitoring system.	experimentation	2
6. DSC signal controller (Texas Instruments) with digital and analog interface for electronic power converters	experimentation	2
7. Speed control of a BLAC motor through the electronic converter interfaced with a DSP - Texas Instruments.	experimentation	2
Bibliography **1. O. Neamţu,** Convertoare electronice de putere – Simulare şi interfaţare PC, Ed. Universităţii din Oradea, 2005. **2. O. Neamţu,** Convertoare electronice de putere – Îndrumător de laborator, 2011. 3. A.Khaligh, O.C. Onar, Energy harvesting: solar, wind, and ocean energy conversion, CRC Press Taylor & Francis Group, 2010 4. Bogdanov, Microprocesorul in comanda acţionarilor electrice, Ed. Facla, Timişoara, 1989. 5. A. Kelemen, M Imecs, Electronica de putere, E.D.P. Bucureşti, 1981.		

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

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline Electronic power converters, students acquire a consistent knowledge, in accordance with the required skills
- the course exists in the curriculum of Romanian universities and faculties
- the content of the course is appreciated by the companies that have as employees graduates of this course

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Note 5 The assessment criteria are based on the completeness and correctness of the knowledge, logical coherence, creativity. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, attendance at classes.	Written or online / testing theoretical and applied knowledge based on written work or paper.	70 %
10.6 Laboratory	Note 5 - performing laboratory	Oral or online / questions based on the applications	30%

	work and demonstrating applied and theoretical skills. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, interest in individual study, active participation.	made a percentage of 15.% of the final grade from the laboratory, is awarded for the successful completion of the individual study topic.	
10.8 Minimum performance standard: Course: 5 Laboratory:5			

Completion date: 25.09.2023

Assoc.Prof.Dr.Ing. Ovidiu Marius Neamțu
E-mail: oneamtu@uoradea.ro

Date of endorsement in the department: 27.09.2023

Head of Department
Prof.Dr. Ing. Nistor Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board: 29.09.2023

Dean
Professor habil. Francisc - Ioan HATHAZI
E-mail: francisc.hathazi@gmail.com

Subject Description

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		Industrial Electronics					
2.2 Holder of the subject		Prof.univ.dr.ing. Trip Nistor Daniel					
2.3 Holder of the academic seminar/**laboratory**/project		- / Ş.l. dr.ing. Morgoş Florin Lucian / Prof.univ.dr.ing. Trip Nistor Daniel					
2.4 Year of study	III	2.5 Semester	I	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

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

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 seminar/laboratory/project	-/1/1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 seminar/laboratory/project	-/14/14
Distribution of time					44
Study using the manual, course support, references and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					2
Examinations					2
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	-
5.2. for the development of the seminar/laboratory/project	-

6. 6. Specific skills acquired	
Professional skills	C1. The use of fundamental elements regarding devices, circuits, systems, instrumentation and electronic technology. C4. Design and use of hardware and software applications of reduced complexity specific to the applied electronics. C5. Applying the knowledge, concepts and basic methods of: power electronics, automatic systems, electricity management, electromagnetic compatibility.
Transversal skills	

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

7.1 The general objective of the subject	The discipline aims to contribute to the acquisition of basic knowledge: theoretical, practical and design, in the field of industrial electronics. Emphasis is placed on the classic and recent ways of conversion of electricity using: recovery circuits, continuous voltage stabilizers and switching, etc.
7.2 Specific objectives	It is aimed at learning the functioning, modeling and design of electricity conversion circuits using natural and forced switching techniques of electronic power devices, PWM control techniques, improving electrical parameters using voltage and current stabilizers.

8. Contents*

8.1 Course / lecture	Teaching methods	No. of hours/ Observations
Introduction. Power electronic device – generalities. Modelling of power electronics devices.	Interactive lecture	2
Single phase rectifiers, half wave and full wave with resistive load. Conversion efficiency.	Interactive lecture	2
Thyristor. Controlled rectifiers. Three phase rectifiers.	Interactive lecture	2
Uncontrolled and controlled rectifiers with series resistive inductive load. Rectifiers with resistive capacitive loads.	Interactive lecture	2
PWM rectifiers. Filtering circuits.	Interactive lecture	2
Voltage regulators. Specialized integrated circuits for voltage regulation.	Interactive lecture	2
LM 78XX voltage regulators family. Applications.	Interactive lecture	2
Switching mode power supply. Introduction.	Interactive lecture	2
Buck swithing mode power supply.	Interactive lecture	2
Boost and Buck-boost switching mode power supplies.	Interactive lecture	2
Switched mode power supply with isolation: Forward and Fly-back.	Interactive lecture	2
Power factor correction circuits. Uninterruptible power supply.	Interactive lecture	2
PWM Inverters.	Interactive lecture	2
Resonant conversion of the electric energy.	Interactive lecture	2

References list

1. I. Ponner, Electronică industrială, E. D. P. Bucureşti, 1972.
2. P. Constantin, Electronica industrială pentru subingineri, E. D .P. , Bucureşti , 1976.
3. S.Florea , I.Dumitrache, I.Găburici, Fl.Munteanu, S.Dumitriu, I.Catană, Electronică industrială , E.D.P. Bucureşti, 1980.
4. D. Constantin , V. Buzuloiu, C. Rădoi, E. Ceangă, V. Neagoe, Electronică Industrială, E.D.P. Bucureşti, 1980.
5. P. Constantin, S. Bîrcă - Gălăţeanu, O. Radu, C. Rădoi, V. Lăzărescu, Gr.Nelepcu, N.Drăgulinescu, Electronică industrială, manual pentru subingineri, Ed. a II-a revizuită, E.D.P., Bucureşti, 1983.
6. T. Maghiar, M. Călugăreanu, C. Stănescu, K. Bondor, Electronica industrială, Editura Universităţii din Oradea,

2001.
7. Bondor Károly, Maghiar Teodor, Dispozitive şi circuite electronice, Editura Universităţii din Oradea, 2004.
8. N.D. Trip, Electronică Industrială, Editura Universităţii din Oradea, 2004.
9. N.D. Trip, A. Gacsádi, D. Scurtu, Electronică Industrială, Îndrumător de laborator, Editura Universităţii din Oradea, 2005.
10. N.D. Trip, Electronică industrială. Elemente introductive de proiectare., Editura Universității din Oradea, 2021, ISBN 978-606-10-2178-9.
11. N.D. Trip, Surse de alimentare. Îndrumător de laborator., Editura Universității din Oradea, 2022, ISBN 978-606-10-2230-4.

8.2 Seminar	Teaching methods	No. of hours/ Observations
-	-	-
8.3 Laboratory		
Presentation of the topics and protection measurements for the laboratory. Equipment and measuring methods used within the laboratory.	Presentation.	2
Single phase half wave rectifier with resistive and inductive load.	Simulation and experimentation. Checking the results and the report.	2
Controlled rectifiers.	Simulation. Checking the results and the report.	2
Series voltage regulator. LM 78XX specialised integrated circuit.	Simulation and experimentation. Checking the results and the report.	2
Buck switching mode power supply.	Simulation and experimentation. Checking the results and the report.	2
Fly-back switching mode power supply.	Simulation and experimentation. Checking the results and the report.	2
Power factor correction circuit.	Simulation. Checking the results and the report.	2
8.4 Project		
Presentation of the topics and the requirements of design. Presentation of the design stages for a switching mode power supply and the desired results.	Explanation. Dialog.	2
Design of the inductive circuit elements.	Explanation. Demonstration.	2
Design of the filtering stage.	Checking the results of the previous stage. Presentation. Demonstration.	2
Choosing the power electronic devices: BJT, MOSFET, IGBT, switching diodes. Design of the thermal sinks (even on PCB).	Checking the results of the previous stage. Presentation. Demonstration.	2
Design of the control circuit.	Checking the results of the previous stage. Presentation. Study case. Demonstration.	2
Simulation of the switching mode power supply operation and the design of the printed circuit board.	Checking the results of the previous stage. Presentation. Demonstration.	2
Project presentation.	Examination.	2

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

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

The content of the industrial electronic discipline fully responds to the requirements of employers in the field of electronic engineering, telecommunications and information technologies, as at present, much of their production is related to power circuits for different types of equipment: consumption, telecommunications, medical, for mobile equipment, for electric vehicle, for renewable energy sources, and so on.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Active involvement in course hours through communication, argumentation, ingenuity, on the topics subject to debate. Knowing the basic notions regarding all the topics addressed during the class hours.	Oral or in written examination.	60%
10.5 Seminar		Not necessary.	-
10.6 Laboratory	Realization of the requirements indicated in the laboratory works. Crossing the bibliography. A percentage of 10 % of the final note from the laboratory is granted for the successful completion of the individual study topic.	Practical and written tests to verify the training of students for the laboratory activity; Checking the correctness of the results obtained by experimental / simulation.	20%
10.7 Project	Active participation in project hours. Knowing the design stages of a continuous voltage source in the switching. Design of inductive circuit elements, designing the capacitive circuit elements, choosing electronic power devices, designing the control circuit, simulating the functioning of the power supply, making the wiring printed in compliance with some electromagnetic compatibility requirement.	Verification during the degree of realization of the project and the correctness of the results for each design stage.	20%
10.8 Minimum performance standard: Course - knowledge for mark 5 - Minimum knowledge regarding the approach of each imposed subject: electronic principle diagrams, wave forms that describe the functioning of the studied circuits and design relations; Laboratory - knowledge for mark 5 - performing all laboratory applications provided in the discipline sheet and drawing up the reports based on experiments/simulations. Project - knowledge for mark 7 - Presentation and support of the project, understanding the principle of operation of the designed power supply, knowing the way of designing the inductive circuit / capacitive elements, choosing the power semiconductor devices, obtaining correct operating simulations.			

Date of completion

Date of approval in department

Date of approval in Council of the faculty

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

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

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

3.1 Number of hours per week	2	of which: 3.2 course	2	3.3 academic seminar/laboratory	---
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	28	3.6 academic seminar/laboratory	---
Distribution of time					22 hours
Study using the manual, course support, bibliography and handwritten notes					8
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					2
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					8
Tutorials					-
Examinations					4
Other activities.					-
3.7 Total of hours for individual study	**22**				
3.9 Total of hours per semester	**50**				
3.10 Number of credits	**2**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	-

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. **C6. Solving technological problems in the fields of applied electronics:**. - Designing the technology for the fabrication and maintenance (by pointing out at necessary components and operations) of some limited and average-complexity products in the fields of applied electronics
Transversal skills	

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

7.1 The general objective of the subject	The main purpose of the course is to present notions and methods for evaluating the reliability of computer systems and complex electronic systems, both in the design phase and in the testing and operation. This discipline is addressed to system designers, researchers and is useful to future engineers who in the design phase of a product must take into account the aspects of reliability.
7.2 Specific objectives	After completing the discipline "Reliability", students acquire the following skills: • Knowledge and proper use of specific notions of reliability; • Knowledge of reliability indicators: reliability, maintainability, and availability. • Calculation of reliability indicators using reliability block schemes, • Calculation of reliability indicators using Markov chains in discrete time or in continuous time. After completing the discipline "Reliability", students acquire the ability to use what they have learned in this discipline in the case of a rigorous and abstract approach to practical problems that may arise in further research (master's, doctorate).

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
2. Fundamentals of reliability. Reliability parameters. Equipment wear modeling	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
3. Fundamentals of reliability. Maintainability. Maintenance. Availability.	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2
4. Fundamentals of reliability. Distribution laws	Lecture, Explanation, Exemplification, Exercises, Interactive course + video projector / Online	2

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

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Knowledge and proper use of notions specific to reliability Written exam.	Continuous Assessment, computer applications / Online assessment (Online questionnaire)	100 %
10.5 Seminar			
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Knowledge of the basic notions of the treated subject and its interconnections in a percentage of at least 50% for grade 5. Knowledge of the basic notions, meanings, analytical relations and solving the problem that calculates the reliability indicators, in percentage of 100%, for grade 10 (highest grade).			

Completion date:
04.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

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: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

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: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

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: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	**Image Processing and Analysis**						
2.2 Holder of the subject	Prof.dr.ing. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Prof.dr.ing. Cristian Grava						
2.4 Year of study	III	2.5 Semester	6	2.6 Type of evaluation	Ex	2.7 Subject regime	SD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic laboratory/project	1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time (in hours)					44
Study using the manual, course support, bibliography and handwritten notes					12
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Signals and systems, Theory of information transmission, Computer programming and programming languages
4.2 related to skills	C2

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

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

8. Contents*

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

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

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

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

Bibliography
1. C. Grava, V. Buzuloiu,„*Elemente de prelucrarea şi analiza imaginilor*", Editura Universităţii Oradea, 2007
2. L.M. Ivanovici, „*Procesarea imaginilor*",Editura Universităţii Transilvania Braşov, 2003
3. C. Grava, C. Vertan, V. Buzuloiu, *Prelucrarea şi analiza imaginilor. Îndrumar de laborator*, Editura Universităţii din Oradea, 2003

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

- The content of the discipline is adapted to the requirements of some main employers of the students of this specialization. These requirements were synthesized following discussions with representatives of these employers, who work in the industrial park of Oradea.

10. Evaluation

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

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:
15.09.2022

Date of endorsement in the department:

19.09.2022

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

Date of endorsement in the Faculty Board:
23.09.2022

Dean's Signature
prof.univ.dr.ing. Ioan – Mircea Gordan
mgordan@uoradea.ro
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			Digital Signal Processing				
2.2 Holder of the subject			Prof.univ.dr. Sorin CURILA				
2.3 Holder of the academic seminar/laboratory/project			Prof.univ.dr. Sorin CURILA				
2.4 Year of study	III	2.5 Semester	5	2.6 Type of the evaluation	Examination	2.7 Subject regime	FD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					44
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					11
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					-
Examinations					5
Other activities.					-

3.7 Total of hours for individual study	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	-
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. Thomas Holton, Digital Signal Processing, Editura Cambridge University Press, februarie 2021
3. A. Vlaicu : "Prelucrarea digitală a imaginilor", Editura Albastră, Cluj – Napoca, 1997.
4. 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. Thomas Holton, Digital Signal Processing, Editura Cambridge University Press, februarie 2021
3. A. Vlaicu : "Prelucrarea digitală a imaginilor", Editura Albastră, Cluj – Napoca, 1997.
4. M. Curila, S. Curila : Prelucrarea digitala a imaginilor degradate de aerosoli atmosferici, Ed. Univ. Oradea, 2004

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

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

10. Evaluation

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

Completion date:
1.09.2023

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

Date of endorsement in the department:
27.09.2023

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:
28.09.2023

Dean,
Prof.univ.dr. habil. Francisc Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Computer networks**				
2.2 Holder of the subject			**Conf.dr.ing. Ovidiu Marius NEAMȚU**				
2.3 Holder of the academic seminar/laboratory/project			**Conf.dr.ing. Ovidiu Marius NEAMȚU**				
2.4 Year of study	III	2.5 Semester	6	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					**33**
Study using the manual, course support, bibliography and handwritten notes					**10**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					**10**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**8**
Tutorials					**3**
Examinations					**2**
Other activities.					
3.7 Total of hours for individual study	**33**				
3.9 Total of hours per semester	**75**				
3.10 Number of credits	**3**				

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	projector and internet access in the classroom, but also online on the e.uoradea.ro platform and the Microsoft Teams program, depending on the Covid pandemic situation
5.2.for the development of the academic	for each student, computer with internet access and electronic modules necessary for the laboratory, but also online on the e.uoradea.ro platform

seminary/laboratory/project	and the Microsoft Teams program, depending on the situation of the Covid pandemic

6. Specific skills acquired

Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics. / 1 credit** **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility. / 1 credit** **C6. Solving technological problems in the fields of applied electronics. / 1 credit**
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 objectives are focused on acquiring the terminology and the principles of connecting computers in the network, of communication protocols; understanding how the client-server works and the connection topologies for networks.
7.2 Specific objectives	▪ knowledge of hardware components for the computer network; ▪ knowledge of software implementations for networks; computers ▪ knowledge of how to protect data transmitted in computer networks.

8. Contents*

8.1 Course The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Communications between internal components of computer systems	lecture, discussion and exemplification	2
2. External communications with other computer systems	lecture, discussion and exemplification	2
3. Management of high speed interfaces	lecture, discussion and exemplification	2
4. Windows Server	lecture, discussion and exemplification	2
5. Local network	lecture, discussion and exemplification	2
6. Distributors and repeaters in the network: Switch and Hub	lecture, discussion and exemplification	2
7. Electronic modules used in the network	lecture, discussion and exemplification	2
8. Metropolitan network	lecture, discussion and exemplification	2
9. Wide area network	lecture, discussion and exemplification	2
10. Transmission media	lecture, discussion and exemplification	2
11. Remote control of networked computers	lecture, discussion and exemplification	2
12. Monitoring of electronic sensors in the network	lecture, discussion and exemplification	2
13. Network security	lecture, discussion and exemplification	2
14. Network security, attacks and countermeasures - VPN mechanisms, tunneling.	lecture, discussion and exemplification	2
Bibliography **1. O. Neamţu,** Arhitectura Calculatoarelor, Ed. Universităţii din Oradea, 2008 **2. O. Neamţu,** Testarea calculatoarelor - Depanare experimentală, Ed. Universităţii din Oradea, 2002 3. Muntenu, s.a..Reţele Windows, Ed. Polirom, Bucureşti, 2004. 4. Tanenbaum A.S, Computer Networks, Prentice Hall PTR, 2005		
8.2 Academic seminar/laboratory/project The activity can also be carried out online	Teaching methods	No. of hours/ Observations
1. Functional testing of interfaces used in the computer network	experimentation	2
2. Performance evaluation for electronic interfaces used	experimentation	2

in the network.		
3. Sharing peripherals (printer)	experimentation	2
4. Configuring a Windows Server	experimentation	2
5. Install and configure a DNS server	experimentation	2
6. Network anti-virus protection	experimentation	2
7. Wireless network	experimentation	2

Bibliography

1. O. Neamţu, Arhitectura Calculatoarelor, Ed. Universităţii din Oradea, 2008
2. O. Neamţu, Testarea calculatoarelor - Depanare experimentală, Ed. Universităţii din Oradea, 2002
3. Muntenu, s.a..Reţele Windows, Ed. Polirom, Bucureşti, 2004.
4. Tanenbaum A.S, Computer Networks, Prentice Hall PTR, 2005

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

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline of Computer Networks, students acquire a consistent knowledge, in accordance with the required skills
- the course exists in the curriculum of Romanian universities and faculties
- the content of the course is appreciated by the companies that have as employees graduates of this course

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Note 5 The assessment criteria are based on the completeness and correctness of the knowledge, logical coherence, creativity. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, attendance at classes.	Written or online / testing theoretical and applied knowledge based on written work or paper.	70 %
10.6 Laboratory	Note 5 - performing laboratory work and demonstrating applied and theoretical skills. Note 10 - correct answer to all questions ensuring the professional skills required by the academic and professional environment. In addition, the student must meet conscientiousness, interest in individual study, active participation.	Oral or online / questions based on the applications made a percentage of 15.% of the final grade from the laboratory, is awarded for the successful completion of the individual study topic.	30%

10.8 Minimum performance standard: Course: 5 Laboratory:5

Completion date: 25.09.2023

Assoc.Prof.Dr.Ing. Ovidiu Marius Neamțu
E-mail: oneamtu@uoradea.ro

Date of endorsement in the department: 27.09.2023

Head of Department
Prof.Dr. Ing. Nistor Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board: 29.09.2023

Dean
Professor habil. Francisc - Ioan HATHAZI
E-mail: francisc.hathazi@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 The Department	**Department of Electronics and Telecommunications**
1.4 Do the study menu	**Electronic Engineering , Telecommunications and Information Technology**
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program / Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

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

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

3.1 Number of hours per week	**5**	of which: 3.2 course	**2**	3.3 laboratory	**2**	3.4 project	**1**
3.4 Total hours in the curriculum	**70**	of which: 3.5 course	**28**	3.6 lab speaker	**28**		**14**

Distribution of time fund	30 hours
Study by textbook, course support, bibliography and notes	10
Additional documentation in the library, on specialized electronic platforms and in the field	5
Preparation of seminars / laboratories, homework, papers, portfolios and essays	5
tutorial	5
Review	5

3.7 Total hours of individual study	**30**
3.9 Total hours per semester	100
3.10 Number of credits	4

4. Preconditions (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents *

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

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

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

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

Bibliography
Laboratory guide - electronic CD format

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

The content of the discipline is in accordance with the subject taught in other university centers. For better complicated to adapt to market demands discipline content had meetings with employer representatives in the field.

10. Evaluation

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

10.5 Seminar	-	-	-
10.6 Laboratory	Carrying out all laboratory applications provided in the discipline file. Active participation in all laboratory classes with a very good presentation of the works by the student.	Written evaluation (during semester): report. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic.	30%
10.7 Project	-	-	-
10.8 Minimum standard of performance : Knowledge of the fundamental elements of theory, terminology in the field, solving a simple technical problem. Interpretation of the technical documentation of a device .			

Completion date:

15.09.2023

Date of endorsement in the

department: 27.09.2023

Date of endorsement in the Faculty

Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	**Television**						
2.2 Holder of the subject	**Lect.dr.eng. Gavriluţ Ioan**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.dr.eng. Gavriluţ Ioan**						
2.4 Year of study	III	2.5 Semester	6	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DD

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

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

Distribution of time	44
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	-
Examinations	4
Other activities.	-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

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

6. Specific skills acquired

Professional skills	**C2. Applying basic methods for the acquisition and processing of signals:** - The temporal, spectral and statistic characterization of signals. - Explaining and interpreting methods for the acquisition and processing of signals. - Using specific methods and instruments for signal analysis. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. - Using adequate performance criteria for the evaluation, including evaluation by simulation, of hardware and software parts of some dedicated systems or of some activities and services that use microcontrollers or low/ average-complexity computing systems. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods.
Transversal skills	

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

7.1 The general objective of the subject	The course aims to familiarize with the main problems of capture, transmission and reproduction on television. It presents the general characteristics of television systems, the specific problems of color television, types of transmission of image and sound information. The laboratory works consider the deepening and completion of the theoretical knowledge by getting acquainted with the defect simulation stand Lucas Nulle and by using LED TV for measurements and practical applications
7.2 Specific objectives	- Acquiring specific problems in television: capture, transmission and reproduction; - Understanding the general characteristics of television systems: types of transmission of image and sound information; - Knowledge of the specific problems of color television; - Understanding the general principles regarding LCD and LED screens;

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations

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

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

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

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

10. Evaluation

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

Completion date:

25.09.2023

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Date of endorsement in the department:

27.09.2023

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:

29.09.2023

Dean,
Prof.dr.eng.habil. Francisc-Ioan HATHAZI
E-mail: francisc.hathazi@gmail.com

Subject Description

1. Data related to the study program

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

2. Data related to the subject

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

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

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

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

Distribution of time	69
Study using the manual, course support, references and handwritten notes	25
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
Examinations	2
Other activities	

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	-
5.2. for the development of the seminar/laboratory/project	-

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

Transversal skills	

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

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

8. Contents*

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

Biography / References list

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

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

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

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

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

10. Evaluation

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

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

Date of completion

Date of approval in department

Date of approval in Council of the faculty

Subject Description

1. Data related to the study program

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

2. Data related to the subject

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

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

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

3.1 Number of hours per week	**1**	of which: 3.2 course	-	3.3 seminar/laboratory/project	-/-/**1**
3.4 Total of hours from the curriculum	**14**	of which: 3.5 course	-	3.6 seminar/laboratory/project	-/-/**14**
Distribution of time					11
Study using the manual, course support, references and handwritten notes					4
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					0
Tutorials					1
Examinations					2
Other activities					

3.7 Total hours for individual study	**11**
3.9 Total hours per semester	**25**
3.10 Number of credits	**1**

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	-
5.2. for the development of the seminar/laboratory/project	-

6. Specific skills acquired

Professional skills	C3. Applying knowledge, concepts and basic methods of architecture of computing systems, microprocessors, microcontrollers, language and programming techniques.
Transversal skills	

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

7.1 The general objective of the subject	Discipline aims to provide students with practical training in making a software application on a microcontroller development circuit or making an electronic small / medium complexity based on a microcontroller.
7.2 Specific objectives	It is intended to equip the mode of microcontrollers and their programming to serve different applications. Place emphasis on how to rally a microcontroller interface circuits.

8. Contents*

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

References

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

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

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

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

10. Evaluation

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

Date of completion

Date of approval in department

Date of approval in Council of the faculty

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	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		**Applications of complex electronic systems**					
2.2 Holder of the subject		**Lect.dr.eng. Gavriluţ Ioan**					
2.3 Holder of the academic seminar/laboratory/project		**Lect.dr.eng. Gavriluţ Ioan**					
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/**laboratory**/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/**laboratory**/project	28
Distribution of time					44
Study using the manual, course support, bibliography and handwritten notes					16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					0
Examinations					7
Other activities.					0
3.7 Total of hours for individual study	**44**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Explaining and interpreting production processes and maintenance activities for the electronic equipment, identifying the points for testing and the electrical measurements to be determined.
Transversal skills	

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

7.1 The general objective of the subject	- acquiring basic knowledge on the issue of complex electronic equipment - knowledge of the structure and mode of operation and use of complex electronic equipment
7.2 Specific objectives	- the operating principle of a multimedia electronic device - the internal structure and ways of interconnecting complex electronic and multimedia equipment - testing the functional parameters of some electronic equipment

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Ch. 1. Generalities regarding the structure of electronic equipment. Introductory notions. Equipment interconnectivity	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	4
Ch. 2. Electronic measurement and control equipment. Digital multimeters, Oscilloscopes, Logic analyzers, Signature Analyzers		8
Ch. 3. Multimedia video equipments. Digital cameras, Digital video cameras		4
Ch 4. Radio receivers. Superheterodyne radio receivers, Digital radio receivers		5
Ch. 5. TV receivers. Digital color TV receivers, LCD TV Receivers, OLED TV Receivers		7

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. The study of an amplification stage made with a transistor		2
L. 4. The study of DC voltage stabilizers		2
L. 5. The study of a switching voltage source		2
L. 6. The realization of an audio power amplifier		2
L. 7. The study of a schematic diagram of a radio receiver		2
L. 8. Testing a radio receiver		2
L. 9. Digital radio receivers		2
L. 10. The study of a schematic diagram of a color TV receiver		2
L. 11. LCD TV Receivers		2
L. 12. OLED TV Receivers		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:

25.09.2023 Lect.dr.eng. Gavriluţ Ioan Lect.dr.eng. Gavriluţ Ioan

gavrilut@uoradea.ro, gavrilut@uoradea.ro,

Date of endorsement in the department:
27.09.2023

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

Dean,
Prof.dr.eng.habil. Francisc-Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Electronic converters modeling**					
2.2 Holder of the subject		Șchiop Adrian					
2.3 Holder of the academic seminar/laboratory/project		Șchiop Adrian					
2.4 Year of study	4	2.5 Semester	7	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD

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

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	34
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	17
Tutorials	2
Examinations	2
Other activities.	0

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. **C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods.
Transversal skills	

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

7.1 The general objective of the subject	▪ Knowledge of converter control techniques ▪ Knowledge of methods of modeling and simulation of multilevel inverters
7.2 Specific objectives	▪ The student is able to demonstrate that he has acquired consciousness regarding: the method of mediation in the space of state variables for different converters; converter control techniques using the mediated model of status variables; PWM control techniques applied to classical and multilevel voltage inverters; circuit control techniques for power factor correction.

8. Contents*

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

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

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

Bibliography

1. A. Şchiop Contribuţii la studiul convertoarelor utilizate la acţionarea motoarelor asincrone, Editura Politehnica, 2007.
2. A. Şchiop Comanda echipamentelor electronice – Îndrumător de laborator, Editura Universităţii din Oradea, 2012

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

- The acquired skills will be required for employees working in the field of design, simulation and control of electronic equipment.

10. Evaluation

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

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

Completion date:
15.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

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		**Medical Electronics**					
2.2 Holder of the subject		Ioan Buciu					
2.3 Holder of the academic seminar/laboratory/project		Ioan Buciu					
2.4 Year of study	**IV**	2.5 Semester	**VII**	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	Hours 58
Study using the manual, course support, bibliography and handwritten notes	24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	9
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	16
Tutorials	5
Examinations	4
Other activities.	

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	Videoprojector, charter school

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. **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.
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	▪ Medical Electronics targets the bachelor students from BST programme. The course comprises basic elements of medical devices and technologies, focusing on portable devices. Hand-on assignments are lined up with the principles of the course so that the students get familiar with both theoretical and technical aspects of the field.
7.2 Specific objectives	▪ To deeply understand the principles of biomedical data analysis and medical electronics; to elaborate the mathematical framework for the underlying methods used in medical electronics.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Fundamentals of medical electronics. Biosignals and cell electrophysiology.	Tutorial, Q&A	2
The phisiological effect of electrical current for human body.	Tutorial, Q&A	2
Image tranforms	Tutorial, Q&A	2
Biomedical signals analysis. Electrodes.	Tutorial, Q&A	4
Vascular technology. Heartbeat , oximetry and electrocardiography.	Tutorial, Q&A	2

Respiratory systems and technology	Tutorial, Q&A	2
Laser technology for medical purposes.	Tutorial, Q&A	4
Ultrasounds and echography.	Tutorial, Q&A	4
X-ray based technology.	Tutorial, Q&A	2
Magnetic resonance imagery and tomography.	Tutorial, Q&A	2
Electrotherapy devices.	Tutorial, Q&A	2
Bibliography Strungaru R. "Electronică medicală" Bucureşti ,E.D.P. 1982 Draghiciu Nicolae –Electronica medicala , Ed. Universitatii din Oradea 2011 Popa Rustem –Electronica medicala , Ed.Matrix Rom Bucuresti 2006 T.D.Gligor, A.Policec, O.Bartos, V.Goian - "Aparate electronice medicale", Editura Facla, Cluj-Napoca, 1988		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Standards for protection against faulty use of medical devices.	Hands-on assign.	2
Heartbeat monitoring using AD8232	Hands-on assign.	2
Photoplethysmography	Hands-on assign.	2
Pulse and oxygenation monitoring with MAX 30102	Hands-on assign.	2
Contactless temperature measuring with MLX 90614	Hands-on assign.	2
Muscle activity monitoring.	Hands-on assign.	2
Computer assignements	Hands-on assign.	2
Bibliography Strungaru R. "Electronică medicală" Bucureşti ,E.D.P. 1982 Draghiciu Nicolae –Electronica medicala , Ed. Universitatii din Oradea 2011 Popa Rustem –Electronica medicala , Ed.Matrix Rom Bucuresti 2006 T.D.Gligor, A.Policec, O.Bartos, V.Goian - "Aparate electronice medicale", Editura Facla, Cluj-Napoca, 1988		

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 responding to practical applications that can be applied in the production process of most electronic component manufacturers in the industrial park of Oradea– Celestica, Plexus, Connectronics, etc.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	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	75 %
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	Evaluation - designing a practical application. The evaluation can be done face to face or online.	25 %

	- For 10:		
10.7 Project			
10.8 Minimum performance standard: Course: Principles of Electrocardiogram. Academic seminar: NA Laboratory: Pulse monitoring Project: NA			

Completion date:

15.09.2023

Signature of the course holder

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

Signature - laboratory holder

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

Date of endorsement in the department:

27.09.2023

Signature Departament Directory

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

Date of endorsement in the Faculty Board:

29.09.2023

Dean's Signature

Prof.univ.dr.ing. habil. Francisc Ioan HATHAZI
francisc.hathazi@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	**Electronics engineering, telecommunications and information technologies**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Applied Electronics/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Medical Imaging**						
2.2 Holder of the subject	Prof. Cristian Grava						
2.3 Holder of the academic seminar/laboratory/project	Prof. Cristian Grava						
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	VP	2.7 Subject regime	SD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14
Distribution of time (in hours)					58
Study using the manual, course support, bibliography and handwritten notes					24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					6
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Medical electronics
4.2 related to skills	C2

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

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

8. Contents*

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

Bibliography

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

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

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

Bibliography

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

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

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

10. Evaluation

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

Completion date:
26.09.2023

Signature of the course holder

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

Signature of the laboratory holder

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

Date of endorsement in the department:

27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Dean's Signature
prof.dr.ing. Francisc Ioan Hathazi
ihathazi@uoradea.ro, https://prof.uoradea.ro/ihathazi/

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
02.09.2023

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

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

Date of endorsement in the department:
27.09.2023

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

Date of endorsement in the Faculty Board:
29.09.2023

Signature of the Dean
Prof.dr.ing. Ioan Francisc Hathazi
francisc.hathazi@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
1.6 Study program/Qualification	Applied Electronics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Optoelectronics**					
2.2 Holder of the subject		Associate Prof.PhD.Castrase Simona Cristina					
2.3 Holder of the academic laboratory		Associate Prof.PhD.Castrase Simona Cristina					
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic laboratory	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time					33
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					6
Tutorials					5
Examinations					4
Other activities.					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	Videoproiector -on site
5.2.for the development of the academic laboratory	Laboratory with specific equipment

6. Specific skills acquired

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

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

7.1 The general objective of the subject	Concepts, technologies, operating principles of the main optoelectronic devices and applications of optoelectronic devices, which operate on the basis of the emission stimulated by electromagnetic radiation.Understanding the operating principles of optoelectronic devices and circuits, as well as methods for measuring electrical quantities.
7.2 Specific objectives	The student will know the optoelectronic devices. He will master the phenomena underlying optoelectronic devices, will know the internal structure and operation of various devices, the significance components parameters, the use in applications of the catalog parameters of optoelectronic components, knowledge of the characteristics of optoelectronic components technologies, determination or by measurement) of the properties of optoelectronic components, analysis and design of simple circuits with them, knowledge of the characteristics of the main technologies for the realization of interconnection structures. Assimilation of theoretical knowledge on the design and simulation of electronic circuits. Analysis of medium-high complexity circuits using simulation programs.

8. Contents*

8.1 Course	Teaching methods	hours
Optoelectronics. Definitions, basic concepts. Physical sizes.		2
Electromagnetic wave. Propagation equation. Properties.		2
Electromagnetic radiation. Ripple aspects. Electromagnetic wave spectrum. Reflection and refraction of electromagnetic waves		2
Light absorption, diffusion and dispersion, Nonlinear optical phenomena		2

Light sources and black body radiation Corpuscular aspects of electromagnetic radiation. External photoelectric effect	Direct teaching aided by visual methods of presentation on site	2
Stimulated emission of electromagnetic radiation. Laser effect		2
Optoelectronic devices. Electromagnetic radiation receiving devices. General notions. Photoresistors. Photodiode. Photoelements. Solar cells		2
P-i-n photodiodes. Avalanche photodiodes. Heterojunction avalanche photodiodes. Load coupling (transfer) (CCD) devices. Phototransistors		2
Characteristic sizes of photodetectors. Limiting the performance of detectors. The noise		2
Electromagnetic radiation emitting devices. Light emitting diode. Semiconductor lasers. Laser diodes. Laser wavelength of laser diodes. Laser beam characteristics. Principle of operation of lasers.		2
Laser diodes with double heterostructure. Lasers with quantum potential pits and lasers with quantum centers. Lasers with distributed reaction. Lasers with emission through the surface of a vertical cavity		2
Optical modulators. Electro-optical modulators. Acoustic-optical modulators		2
Optical amplifiers. Erbium doped fiber amplifiers. Raman amplifiers. Pumping lasers		2
Optoelectronic systems. Optical communication systems. Optical communication channel.Transmitter.Receiver.Parameters of the communication system.Considerations on the communication system		2

Bibliography
S. Castrase,Optoelectronică, Curs, ISBN 978-606-10-2079-9, Ed. Universitatii Oradea, 2019.
S. Castrase, Electronică cuantică, Curs, ISBN 978-606-10-1862-8, Ed. Universitatii Oradea, 2016.
Gh.Cimpoca, A.Gheboianu, Optoelectronica. Materiale, dispozitive si aplicatii, Ed. Bibliotheca,2007
C. Dan, Dumitras, Ingineria fasciculelor laser, Ed. All, ISBN: 973-571-522-8, 2004.
M. Delibas, Elemente de optică şi spectroscopie, Ed. Universităţii Al. I. Cuza",Iaşi 1997
T.D. Strugariu, Laserii. Principii de funcţionare. Ed. tehnică, 1999.
I. M. Popescu, Fizica si ingineria laserilor, Ed. Tehnică Bucuresti, 2000.

8.2 Academic laboratory	Teaching methods	No. of hours
1. Presentation of the laboratory and laboratory works, labor protection. Photometry - the distance dependence of the illumination of a surface	application problems	2
2. The angle dependence of the light intensity of a source		2
3. External photoelectric effect. Photoelectric cell.		2
4. Study of the characteristics of optoelectronic devices		2
5. Study of the emission parameters of the laser diode		2
6. Optical modulators		2
7. Recovery of laboratory works, assessment of knowledge.		2

Bibliography
S. Castrase, Optoelectronică,Îndrumător de laborator, ISBN 978-606-10-2175-8, Ed. Universitatii Oradea, 2021
P.Schiopu, Optoelectronica, Indr. de laborator, Ed. MatrixRom 2008
N. Puscas ,Lucrari experimentale de optoelectronica, fizica si ingineria laserilor, Ed. MatrixRom, 2004
I. M. Popescu, A.M. Preda, Aplicaţii ale laserilor, Ed. Tehnică Bucureşti, 1979
V. Vasiliu, Laserii cu He-Ne şi aplicaţiile lor, Ed. Ştiinţifică Bucureşti, 1987

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum requirements for passing the exam (note 5): knowledge of the notions of optoelectronic components technologies,, laws and theorems on electronic circuits; knowledge of the representation and operation of optoelelectronic devices,. For grade 10 thorough knowledge of the characteristics of optoelectronic components technologies, determination or by measurement) of the properties of optoelectronic components, analysis and design of simple circuits with them, knowledge of the characteristics of the main technologies for the realization of interconnection structures. ; The laboratory activity is completed and marked with a grade of 10.	Exam. Written test	70%
10.5 Seminar			
10.6 Laboratory	Minimum required conditions for passing the examination (grade 5): knowledge on how to represent optoelectronic devices, knowledge on the operation of them, minimum knowledge on the use of electronic simulation program Knowledge for grade 10:	Individual themes	30%

	knowledge of the construction and operation of optoelectronic devices, knowledge of signal representation on a circuit, ability to determine the performance of an electronic circuit, knowledge of mathematical modeling of currents and voltage drops on circuits, calculation of quantities of interest. 15% of the grade from the laboratory is the evaluation of individual topics		
10.7 Project	-		
10.8 Minimum performance standard: Knowledge of the constructive parts and the principle of operation of different types of optoelectronic devices. Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of appliances and equipment in the fields of applied electronics. Knowledge of solving, how to represent and operate optoelectronics devices.Participation in at least half of the courses and in all laboratory classes.			

Completion date:

Date of endorsement in the department:

Date of endorsement in the Faculty Board:

Subject Description

1. Data related to the study program

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

2. Data related to the subject

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

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

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 seminar/laboratory/project	-/1/-
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 seminar/laboratory/project	-/14/-
Distribution of time					58
Study using the manual, course support, references and handwritten notes					30
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					2
Examinations					2
Other activities					

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	-
5.2. for the development of the seminar/laboratory/project	-

6. Specific skills acquired	
Professional skills	C2. Applying basic methods for signal purchase and processing. C3. Applying knowledge, concepts and basic methods of architecture of computing systems, microprocessors, microcontrollers, language and programming techniques. C4. Designing and using reduced hardware and software applications specific to applied electronics.
Transversal skills	

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

7.1 The general objective of the subject	Discipline aims to contribute to the acquisition of basic knowledge: theoretical, practical and design, in the field of numerical signal processors. Emphasis is placed on how to operate the signal processors on the implementation of algorithms using high levels / assembly languages.
7.2 Specific objectives	It is aimed at acquiring the mode of operation and programming applications for numerical signal processors used in various applications with emphasis on deployment of digital filters.

8. Contents*

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

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

References

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

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

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

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

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

10. Evaluation

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

Date of completion

Date of approval in department

Date of approval in Council of the faculty

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	**Mobile Robots**						
2.2 Holder of the subject	**Lect.dr.eng. Gavriluţ Ioan**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.dr.eng. Gavriluţ Ioan**						
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/**laboratory**/project	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/**laboratory**/project	14
Distribution of time					58
Study using the manual, course support, bibliography and handwritten notes					21
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					15
Tutorials					5
Examinations					5
Other activities.					0
3.7 Total of hours for individual study	**58**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Defining concepts, principles and methods used in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - Explaining and interpreting specific requirements for hardware and software solutions in the fields of: computer programming, high-level and specific languages, CAD techniques for completing electronic modules, microcontrollers, computing systems architecture, programmable electronic systems, graphics, reconfigurable hardware architecture. - The design of dedicated equipment from the field of applied electronics that use: microcontrollers, programmable circuits or simple-architecture computing systems, including the related software. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize the electronic devices and circuits from the fields of: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. - The elaboration of technical specifications, installation and exploitation of equipment in the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Applying the principles of management for the organization, from the technological point of view, of production, exploitation and service activities in the fields of applied electronics.
Transversal skills	

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

7.1 The general objective of the subject	▪ The course aims to make an introduction in the field of robotics and the treatment of specific electronics problems in robotics. The structure of the mobile robot, the mechanical system, control and programming methods, 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 mobile robots by using Raspberry Py, the sensory system of the robots.
7.2 Specific objectives	▪ Acquiring specific problems in robotics: robot structure, ▪ Understanding and using control methods and programming of mobile robots; ▪ Knowledge of specific electronics problems in mobile robotics; ▪ Understanding the principles of operation and structure of the main sensors used in robotics; ▪ Design and practical execution of orders for the mobile robot by using Raspberry Py development board.

8. Contents*

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

Classification of mobile robots	Exposition of theoretical elements and examples of practical applications. Discussions and questions The activity can also be carried out online	2
The structure of a mobile robot		2
Robotic arms		2
Transducers – sensors for measuring of internal parameters		2
Methods of driving mobile robots		2
Path Planning the trajectory between two points in the workspace		2
Geometric models of the work environment		2
The sensory system of the mobile robot		2
Visual sensors		2
Transducers used to measure position		2
Position measurement methods		2
Speed measurement methods		2
Actuation systems of mobile robots		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		
I. Gavriluţ, *Contribuţii la navigaţia roboţilor mobili autonomi utilizând reţele neuronale celulare*, Editura Politehnica Timişoara, 2007		
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, 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
The structure of a mobile robot		2
Raspberry Pi development board		2
Acquisition of analog signals with Raspberry PI		2
Internet operation of the Raspberry PI board		2
Ultrasonic sensors		2
Infrared sensors		2
PIR sensors		2
Accurate detection of distance and obstacles		2
Location detection with GPS sensor		2
Electrical engine control		2
Line-follower displacement		2
Wall-following displacement		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		
I. Gavriluţ, L. Ţepelea, *Mobile robots*, digital support, Oradea 2023		

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 mobile robotics Laboratory: Carrying out the laboratory applications provided in the subject description			

Completion date:

25.09.2023

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Date of endorsement in the department:
27.09.2023

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

Dean,
Prof.dr.eng.habil. Francisc-Ioan HATHAZI
E-mail: francisc.hathazi@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 / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	Neural networks and fuzzy systems						
2.2 Holder of the subject	Lect.Eng. Reiz Romulus, PhD						
2.3 Holder of the academic seminar/laboratory/project	Lect.Eng. Reiz Romulus, PhD						
2.4 Year of study	IV	2.5 Semester	VIII	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	14
Distribution of time					58 hours
Study using the manual, course support, bibliography and handwritten notes					16 hours
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20 hours
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12 hours
Tutorials					4 hours
Examinations					6 hours
Other activities.					-

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

5.1. for the development of the course	Video projector The course can take place on site or online
5.2.for the development of the academic seminary/laboratory/project	Computer network, Matlab, toolbox neural networks Laboratory work can be carried out on site or online

6. Specific skills acquired	
Professional skills	**C3. Applying basic knowledge, concepts and methods concerning computer systems architecture, microprocessors, microcontrollers, programming languages and techniques:** - Elaborating programs in a general and/or specific programming language, starting from the specification of requirements and going up to the stages of execution, mending and interpretation of results in correlation with the processor used. - Carrying out projects that involve hardware components (processors and software components (programming). **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - Designing, using consecrated principles and methods, of low complexity systems from the fields of applied electronics: power electronics, automated systems, power management, medical electronics, car electronics, consumer goods. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics.
Transversal skills	-

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

7.1 The general objective of the subject	This discipline aims to familiarize students from the Applied Electronics specialization, with the basic notions in the field of artificial neural networks, recognized as dominant models of artificial intelligence.
7.2 Specific objectives	Understanding and proper use of the main models of neural calculus. Knowledge of the main architectures of neural networks. Knowledge of fundamental learning algorithms. Students will gain the ability to design, implement, test and use a neural network.

8. Contents*

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

14. Neuro-fuzzy systems. Elements of evolutionary computation.	Lecture, presentation, debate	2 hours
Bibliography 1. Cătălin-Daniel Căleanu, Virgil Tiponuț: „Rețele neuronale – Arhitecturi și algoritmi”, Editura politehnica Timișoara, 2002 2.James A. Freeman, David M. Skapura: „Neural Networks, Algorithms, Applications and Programming Techniques”, Addison-Wesley Publishing, 1991 3. D. Dumitrescu, H. Costin: „Rețele neuronale. Teorie și aplicații”, Ed. Teora, București 1996 4. V.Tiponuț, C.D. Căleanu, “Rețele neuronale. Arhitecturi și algoritmi”, Ed. Politehnica, Timișoara, 2001. 5. Mihaela (Ghindeanu) Colhon, „Elemente de Logică Fuzzy”, Craiova, 2012 6. Course –electronic format: e.uoradea.ro		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introduction to MATLAB. Generalities. Toolboxes. Creating MATLAB programs (script files and functions). 2D and 3D representations. Presentation of the neural networking toolbox from MATLAB	Practical application	2 hours
2. Visualization of activation functions used in neural networks.	Practical application	2 hours
3. Models of neurons and artificial neural networks (ANN) I Model of artificial neuron. Basic architectures of ANNs.	Practical application	2 hours
4. The simple perceptron. - Implementation of a perceptron type network. Applications in linear separable classification. Perceptron and adaline training	Practical application	2 hours
5. The multilayer perceptron. Training of multilayer perceptron networks.	Practical application	2 hours
6. Neural networks based on radial functions - The architecture of neural networks based on radial functions. Learning strategies.	Practical application	2 hours
7. Simulating systems with fuzzy logic in Matlab. Examples	Practical application	2 hours
Bibliography 1.Laboratory guide – electronic format: e.uoradea.ro 2. C.D. Căleanu, V. Tiponuț, “Rețele neuronale. Aplicații”, Ed. Politehnica, Timișoara, 2002		

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Verification of theoretical knowledge. Correct and complete treatment of examination topics related to the design, implementation and testing of neural networks, and detailed knowledge of the principles of operation, relationships and fundamental schemes for the most used neural computing models and their applications; Minimum required conditions for passing	Written evaluation. The evaluation can be done face to face or online	70%

	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 should know the main types of neural networks and their training algorithms. Students should be able to implement a simple neural network to solve a specific task (implementation of logical or fuzzy functions, image recognition, etc.).			

Completion date:

14.09.2023

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:
27 .09.2023

Signature of the department director
Prof. Daniel TRIP, PhD

E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

Signature of the Dean
Dean,
Prof.habil. Francisc Ioan HATHAZI, PhD
E-mail: francisc.hathazi@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	2	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					40
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	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	-
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. David Walter Rose III, Dennis R. Combs, The Relationship between Positive Schizotypy and Apophenia in Pattern Recognition, Vol.13 No.10, September 30, 2022, DOI: 10.4236/psych.2022.1310093
4. Vaishali Pawar, Mukesh Zaveri, K-Means Graph Database Clustering and Matching for Fingerprint Recognition, *Intelligent Information Management* Vol.7 No.4, July 30, 2015, DOI: 10.4236/iim.2015.74019
5. B. Escofier, J. Pagčs, ″ *Analyses factorielles simples et multiples* ″, Dunod, 1998
6. Rachid Deriche, Gérard Giraudon *"A computational approach for corner and vertex detection"*
7. Heijmans, ″Morphological Image Operators″, 1994
8. Rong-Jian Chen, Bin-Chang Chieu, ″Multiresolutional Image Representation and Coding Using Morphological Pyramids″
9. S.S.Liu, M.E.Jernigan, ″Texture analysis and discrimination in additive noise″, Computer vision, graphics and image processing 1990, vol.49
10. 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		4

2. Filters	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
3. Recognition algorithm based on the correlation matrix		4
4. Extract local features from intensity images		4
5. Match the models with the image		4
6. Binary morphology. Applications using Morphological Transformations.		2
7. Morphology on gray levels		2
8. Transformed Hough		2
9. Detection of characteristic points by the SUSAN algorithm		2

Bibliography

1. P. Fabre, ″ Exercices de reconnaissance des formes par ordinateur ″, Masson, Paris
2. J. C. Simon, ″ La reconnaissance des formes par algorithmes ″, Masson, Paris, 1984
3. David Walter Rose III, Dennis R. Combs, The Relationship between Positive Schizotypy and Apophenia in Pattern Recognition, Vol.13 No.10, September 30, 2022, DOI: 10.4236/psych.2022.1310093
4. Vaishali Pawar, Mukesh Zaveri, K-Means Graph Database Clustering and Matching for Fingerprint Recognition, *Intelligent Information Management* Vol.7 No.4, July 30, 2015, DOI: 10.4236/iim.2015.74019
5. B. Escofier, J. Pagčs, ″ *Analyses factorielles simples et multiples* ″, Dunod, 1998
6. Rachid Deriche, Gérard Giraudon *"A computational approach for corner and vertex detection"*
7. Heijmans, ″Morphological Image Operators″, 1994
8. Rong-Jian Chen, Bin-Chang Chieu, ″Multiresolutional Image Representation and Coding Using Morphological Pyramids″
9. S.S.Liu, M.E.Jernigan, ″Texture analysis and discrimination in additive noise″, Computer vision, graphics and image processing 1990, vol.49
10. S. Curila, M. Curila, „Tehnici de prelucrare a imaginilor utilizate la recunoasterea formelor”, Ed. Univ. Oradea, 2004

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

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

10. Evaluation

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

10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	The laboratory test will contain the theoretical presentation of an algorithm implemented during the semester and the presentation of the results. The activity can also be carried out online.	Oral presentation	20%
10.7 Project			
10.8 Minimum performance standard: Course: Knowledge of the basics on all the course topics. Academic seminar: Laboratory: Knowledge of the basics on all the laboratory topics. Project:			

Completion date:
1.09.2023

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

Date of endorsement in the department:
27.09.2023

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:
28.09.2023

Dean,
Prof.univ.dr. habil. Francisc Ioan HATHAZI
E-mail: francisc.hathazi@gmail.com

FIŞA DISCIPLINEI

1. Program data

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	**Electronic Engineering, Telecommunications and Information Technologies**
1.5 Cycle of studies	**License (cycle I)**
1.6 Study programme/Qualification	**Applied Electronics / Engineer**

2. Discipline data

2.1 Name of discipline	**Reconfigurable electronic systems**						
2.2 Holder of course activities	**Ş. l. Dr. eng. Albu Răzvan**						
2.3 Holder of seminar/laboratory/project activities	**Ş. l. Dr. eng. Albu Răzvan**						
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of assessment	EX	2.7 Discipline regime	DS

(I) Imposed; (o) optional; (f) Optional

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 Seminar/laboratory/project	0/1/0
3.4 Total hours from the curriculum	42	Of which: 3.5 course	28	3.6 Seminar/laboratory/project	0/14/0

Time Fund Distribution	Hours
Study by textbook, course support, bibliography and notes	14
Additional documentation in the library, on specialized electronic platforms and in the field	8
Preparation of laboratories, themes, papers, portfolios and essays	8
Tutoring	-
Examination	6
Other activities.....	-

3.7 Total self-study hours	**36**
3.9 Total hours per semester	**76**
3.10 Number of credits	**3**

4. Preconditions (where applicable)

4.1 Curriculum	(Conditionari)
4.2 Competence	

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional comp.	▪ **C3. Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques:** - Description of the operation of a computing system, basic principles of architecture of microprocessors and microcontrollers of general purpose, general principles of structured programming. - Use of general-purpose programming languages specific to applications with microprocessors and microcontrollers; explaining the operation of automatic control systems using these architectures and interpreting the experimental results. - Solving concrete practical problems that include elements of data structures and algorithms, programming and use of microprocessors or microcontrollers. - Elaboration of programs in a general and/or specific programming language, starting from specifying requirements to execution, troubleshooting and interpretation of results in correlation with the processor used. - Realization of projects involving hardware components (processors) and software (programming). ▪ **C5. Application of knowledge, concepts and basic methods from: power electronics, automatic systems, power management, electromagnetic compatibility:** - Defining specific elements that individualize electronic devices and circuits in the fields of: power electronics, automatic systems, electricity management, medical electronics, automotive electronics, consumer goods. - Qualitative and quantitative interpretation of circuit operation in the fields of: power electronics, automatic systems, power management, medical electronics, automotive electronics, consumer goods; analysis of 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, power management, medical electronics, automotive electronics, consumer goods. - Evaluation, based on technical quality and environmental impact criteria, of equipment in the fields of applied electronics: power electronics, automatic systems, electricity management, medical electronics, automotive electronics, consumer goods. Design, using established principles and methods, of subsystems of low complexity, in the fields of applied electronics: power electronics, automatic systems, electricity management, medical electronics, automotive electronics, consumer goods. ▪ **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of apparatus and equipment in the fields of applied electronics. - Explanation and interpretation of production processes and maintenance activities of electronic devices, identifying test points and electrical quantities to be measured. - Application of management principles for technological organization of production, operation and service activities in the fields of applied electronics. - Use of criteria and methods for assessing the quality of production and service activities in the fields of applied electronics. - Design of manufacturing and maintenance technology (specifying the necessary components and operations) of products of low and medium complexity in the fields of applied electronics.
Transv. (	

7. The objectives of the discipline (based on the grid of specific competences acquired)

7.1 General objective of the discipline	▪ Ensuring the necessary skills to implement applications on reconfigurable systems. ▪ Methods of programming reconfigurable FPGA systems ▪ The Significance of Real-Time FPGA-Based Systems
7.2 Specific objectives	▪ Programming FPGAs using VIVADO ▪ Generating DRC reports to resolve design errors ▪ HDL synthesis and implementation ▪ Design of low-resource systems, optimization by reducing size and increasing execution speed.

8. Contents*

8.1 Course	Teaching methods	Nr. Hours / Obs.
Ch. 1. Introduction	Interactive exposition, problematization, exemplification	**2**
Ch. 2. Structure of a reconfigurable system		**2**
Ch. 3. General methods of programming FPGAs		**2**
Chapter 4. VIVID IDE		**2**
Ch. 5. Application architecture of reconfigurable systems programming		**2**
Ch. 6. Libraries and functions for programming FPGAs		**2**
Ch. 7. FPGA I/O		**2**
Chapter 8. Data synchronization and parallel execution		4

Ch. 9. Data transfer and synchronization between computer and FPGA		**2**
Ch. 10. Optimizing FPGA applications to increase execution speed or reduce size		4
Ch. 11. Reusing code, importing an external IP		**2**
Ch. 12. Improvements for reconfigurable systems		**2**

Bibliography

1. Albu Răzvan Daniel, *Reconfigurable electronic systems*, course, 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

8.3 Laborator	Teaching methods	Nr. Hours / Obs.
L. 1. Introduction to VIVADO IDE installation and configuration	Discussions, teamwork on the computer	**2**
L. 2. FPGA architecture, hardware design		**2**
L. 3. Programming in VIVADO		**2**
L. 4. Parallel computing algorithms		**2**
L. 5. VIVADO HLS		**2**
L. 6. Design examples, AXI standard		**2**
L. 7. Integration of multiple programs into a complete application		**2**

Bibliography

1. Albu Răzvan-Daniel, Daniel Trip, *Reconfigurable systems. Laboratory Applications*, 2017.
2. Vivado® Design Suite User Guide: High-Level Synthesis
3. Vivado Design Suite Documentation

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

- The content of the discipline is consistent with what is done in other university centers in the country. When developing the discipline, it was taken into account the requirements of engineers in the field of electronics regarding the use of computers.

10. Evaluation

Activity Type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight of final grade
10.4 Course	- correctness and completeness of knowledge, - logical consistency,	- written assessment during the semester. The assessment can be done face-to-face or online	60%
10.6 Laborator	- ability and manner of realization and understanding of practical applications	- FPGA operation. A percentage of 10% of the final grade from the laboratory is awarded for the successful completion of the individual study topic. The assessment can be done face-to-face or online.	40%
10.7 Project	-	-	-
10.8 Minimum performance standard: obtaining grade 5 in each laboratory test; meeting the requirements imposed by each laboratory work; obtaining grade 5 in the course tests, as an arithmetic average of the marks obtained in this type of activity. **Knowledge for grade 5**. Knowledge of the basics of FPGAs and their programming using VIVADO.			

Completion date: 25.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		**Electronic Equipmets Testing**					
2.2 Holder of the subject		**Lect.dr.eng. Gavriluţ Ioan**					
2.3 Holder of the academic seminar/laboratory/project		**Lect.dr.eng. Gavriluţ Ioan**					
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/**laboratory**/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/**laboratory**/project	28
Distribution of time					44
Study using the manual, course support, bibliography and handwritten notes					16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					0
Examinations					7
Other activities.					0
3.7 Total of hours for individual study	**44**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	**C4. Designing and using some hardware and software applications of reduced complexity, specific to applied electronics:** - Identifying and optimizing hardware and software solutions for problems related to: industrial electronics, medical electronics, car electronics, automation, robotics, the production of consumer goods. **C5. Applying basic knowledge, concepts and methods from: power electronics, automated systems, power management, electromagnetic compatibility:** - The qualitative and the quantitative interpretation of circuits functioning in the fields of: medical electronics, car electronics, consumer goods; analyzing the functioning from the point of view of electromagnetic compatibility. **C6. Solving technological problems in the fields of applied electronics:** - Defining the principles and methods that lie at the basis of producing, adjusting, testing and troubleshooting devices and equipment in the fields of applied electronics. - Explaining and interpreting production processes and maintenance activities for the electronic equipment, identifying the points for testing and the electrical measurements to be determined.
Transversal skills	

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

7.1 The general objective of the subject	- acquiring basic knowledge on the issue of testing electronic equipment - knowledge of the structure and mode of operation and use of equipment for assisted testing - knowledge of electronic board testing (visual inspection, in-circuit testing, Boundary Scan technology)
7.2 Specific objectives	- testing the electronic circuits realized on PCB - testing electronic boards using dedicated testers - testing the functional parameters of a radio and TV receiver

8. Contents*

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

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

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

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

10. Evaluation

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

Completion date:
25.09.2023

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Lect.dr.eng. Gavriluţ Ioan
gavrilut@uoradea.ro,

Date of endorsement in the department:
27.09.2023

Departament director,
Prof.dr.eng. Daniel TRIP
E-mail: dtrip@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

Dean,
Prof.dr.eng.habil. Francisc-Ioan HATHAZI
E-mail: francisc.hathazi@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 The Department	**Department of Electronics and Telecommunications**
1.4 Field of study	**Electronic Engineering , Telecommunications and Information Technology**
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program / Qualification	**Applied Electronics / Bachelor of Engineering**

2. Data related to the subject

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

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

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

4. Preconditions (where applicable)

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

5. Conditions (where applicable)

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

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

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

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

8. Contents *

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

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

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

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

10. Evaluation

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

Completion date: 15.09.2020

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject		**Computer Vision**					
2.2 Holder of the subject		Prof. Cristian Grava					
2.3 Holder of the academic seminar/laboratory/project		Prof. Cristian Grava					
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	VP	2.7 Subject regime	SD

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic laboratory	1
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic laboratory	14
Distribution of time (in hours)					58
Study using the manual, course support, bibliography and handwritten notes					24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					6
Examinations					4
Other activities.					
3.7 Total of hours for individual study	**58**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Signals and systems, Information transmission theory, Image processing and analysis, Numerical signal processing, Television basics, Computer programming and programming languages
4.2 related to skills	C2

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

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

8. Contents*

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

Bibliography

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

<table>
<tr><td colspan="3">of the Art", Foundation and Trends in Computer Graphics and Vision, http://dx.doi.org/10.1561/0600000079, 2020
8. M. Elgendy – „Deep Learning for Vision Systems", Manning Publications, ISBN 9781617296192, 2020
9. S. Kanimozhi Suguna, M. Dhivya, Sara – „Artificial Inteligence (AI). Computer Vision Concepts and Applications", ISBN 9781003005629, 2021</td></tr>
<tr><td>8.2 Academic seminar/laboratory/project</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Introductory notions of artificial vision. Introduction to MATLAB</td><td rowspan="7">Practical works for simulation and development of application programs, debates on the problems encountered and methods for solving them</td><td>2</td></tr>
<tr><td>2. Convolution product. Resize images</td><td>2</td></tr>
<tr><td>3. Color spaces</td><td>2</td></tr>
<tr><td>4. Recover the rotation angle and scaling factor of an image</td><td>2</td></tr>
<tr><td>5. Objects Identification using templates</td><td>2</td></tr>
<tr><td>6. Text detection and recognition</td><td>2</td></tr>
<tr><td>7. Recovery of laboratory works</td><td>2</td></tr>
<tr><td colspan="3">Bibliography:
1. C. Grava, C. Vertan, V. Buzuloiu, Prelucrarea şi analiza imaginilor. Îndrumar de laborator, Editura Universităţii din Oradea, 2003
2. C. Grava – „Vedere artificială şi realitate virtuală", Editura Universităţii din Oradea, 2008
3. R. Albu, C. Grava, Vedere Artificială. Aplicaţii, Editura Universităţii din Oradea, ISBN 978-606-10-1727-0, 68 p, 2016
M. Hassaballah, A.I. Awad – „Deep Learning in Computer Vision. Principles and Applications", CRC Press, ISBN 9781138544420, 2020</td></tr>
</table>

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

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.			

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:
26.09.2023

Date of endorsement in the department:

27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

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

Dean's Signature
prof.dr.ing. Francisc Ioan Hathazi
ihathazi@uoradea.ro, https://prof.uoradea.ro/ihathazi/