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	**Electrical Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Electrical engineering / Bachelor of Engineering**

2. Data related to the subject

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

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

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

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

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

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering*, Editura Universității "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, 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:
01.09.2023

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUȘ / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Applied Informatics I**				
2.2 Holder of the subject			prof.PhD.Hathazi Francisc – Ioan				
2.3 Holder of the academic seminar/laboratory/project			--- / prof.PhD.Hathazi Francisc – Ioan / ---				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DF

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	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	10
Tutorials	6
Examinations	8
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	Minimum knowledge of hardware and software

5. Conditions (where applicable)

5.1. for the development of the course	The course can be taken face-to-face or online. Laptop, video projector, magnetic board, free speech.
5.2.for the development of the academic seminary/laboratory/project	- / The laboratory can be carried out face to face or online. Smart board, computer network with workstation for each student, access to software that is studied in the course, network access to the internet / -

6. Specific skills acquired	
Professional skills	• C2. Operating with fundamental concepts in computer science and information technology
Transversal skills	• CT1 – Identify the objectives to be achieved, the available resources, the conditions for their completion, the working stages, the working times, the deadlines and the related risks; • CT2 – Identify roles and responsibilities in a multidisciplinary team and apply effective relationship techniques and teamwork; • CT3 – Efficient 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 course is addressed to students from the ELECTROMECHANICS specialization, trying to familiarize them theoretically but also practically with a series of knowledge about applied informatics. Given the degree of penetration of computer technology in most

	aspects of socio-economic life, the need to acquire computer skills, computer use is clearly required. Thus, the course supports students with information on acquiring the main knowledge in the field.
7.2 Specific objectives	• The lab is designed to provide future engineers with practical computer skills. The content of the laboratories presented is based on the need to deepen and practical explanation of the problems presented in the course. Students have the opportunity to identify specific issues discussed during the course, familiarization with modern means of work. They will understand the complexity of this discipline. Knowledge is useful in developing skills in addressing the specific issues facing a specialist in this field.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introductory course.	Laptop, video projector, IQ Board, free speech	2
2. Computer systems architecture. Knowledge of the main parts of the personal computer: central processing unit (CPU), hard disk, input / output devices, memory types, data carriers. Understanding the term peripheral mechanisms.	Laptop, video projector, IQ Board, free speech	3
3. Operating systems.	Laptop, video projector, IQ Board, free speech	3
4. Basic hardware, software and IT concepts. Short history of programming languages.	Laptop, video projector, IQ Board, free speech	2
5. Advanced editing techniques.	Laptop, video projector, IQ Board, free speech	3
6. Spreadsheet programs.	Laptop, video projector, IQ Board, free speech	3
7. Ethical and legal aspects related to informatics, professional ethics, analytical tools (related to ethics).	Laptop, video projector, IQ Board, free speech	2
8. Aspects related to intellectual property protection: infringement, protection.	Laptop, video projector, IQ Board, free speech	3
9. Privacy issues - private space (internet).	Laptop, video projector, IQ Board, free speech	2
10. Case studies of violation of ethical norms and protection of one's work.	Laptop, video projector, IQ Board, free speech	2
11. Computer viruses. Understand the term computer virus. Understanding and knowing anti-virus measures.	Laptop, video projector, IQ Board, free speech	3

Bibliography

1. Hathazi Francisc – Ioan – Notițe de Curs – în curs de apariție;
2. Francisc Ioan Hathazi, Utilizarea calculatoarelor, Editura Universității din Oradea, ISBN 973-759-089-9, 978-973-759-089-3, 2006, pp.253;
3. FRENTIU, M., PARV, B.: Elaborarea programelor: metode si tehnici moderne, ProMedia, Cluj-Napoca, 1994;
4. GHEZZI, C., JAZAYERI, M.: Programming Language Concepts, John Wiley, 1972;
5. HOROWITZ, E.: Fundamentals of Programming Languages, Springer, 1973;
6. MACLENNAN, B.J.: Principles of Programming Languages: Design, Evaluation and Implementation, Holt, Rinehart and Winston, 1973;
7. PARV, B., VANCEA, A.: Fundamentele limbajelor de programare, Fascicolele 1-2, Lito Univ. "Babes-Bolyai", 1992;
8. PRATT, T.W.: Programming Languages: Design and Implementation, Prentice Hall, 1975;
9. SHAMMAS, N.: Object Oriented Programming with Turbo Pascal, Prentice-Hall, 1990;
10. VOSS, G.: Object-Oriented Programming: An Introduction, Osborne McGraw-Hill, 1991;
11. PARV, B., VANCEA, A.: Fundamentele limbajelor de programare, Ed.Microinformatica, 1996;

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Assessment of digital skills.	Free speech, use of computer network from the laboratory equipment	2
2. The structure of computer systems. Assembly and troubleshooting. Operating systems. Installation. Settings. Case studies.	Free speech, use of computer network from the laboratory equipment	4
3. Advanced editing techniques in MS Word.	Free speech, use of computer network from the laboratory equipment	5

4. Advanced techniques in the MS Excel spreadsheet program	Free speech, use of computer network from the laboratory equipment	5
5. Making professional presentations with MS Power Point	Free speech, use of computer network from the laboratory equipment	5
6. Ethical and legal issues related to informatics.	Free speech, use of computer network from the laboratory equipment	3
7. Protection of intellectual property	Free speech, use of computer network from the laboratory equipment	2
8. Viruses. Case studies.	Free speech, use of computer network from the laboratory equipment	2

Bibliography

1. 1. Hathazi Francisc – Ioan – Notițe de Laborator – în curs de apariție;
2. Francisc Ioan Hathazi, Utilizarea calculatoarelor, Editura Universității din Oradea, ISBN 973-759-089-9, 978-973-759-089-3, 2006, pp.253
3. FRENTIU, M., PARV, B.: Elaborarea programelor: metode si tehnici moderne, ProMedia, Cluj-Napoca, 1994;
4. GHEZZI, C., JAZAYERI, M.: Programming Language Concepts, John Wiley, 1972;
5. HOROWITZ, E.: Fundamentals of Programming Languages, Springer, 1973;
6. MACLENNAN, B.J.: Principles of Programming Languages: Design, Evaluation and Implementation, Holt, Rinehart and Winston, 1973;
7. PARV, B., VANCEA, A.: Fundamentele limbajelor de programare, Fascicolele 1-2, Lito Univ. "Babes-Bolyai", 1992;
8. PRATT, T.W.: Programming Languages: Design and Implementation, Prentice Hall, 1975;
9. SHAMMAS, N.: Object Oriented Programming with Turbo Pascal, Prentice-Hall, 1990;
10. VOSS, G.: Object-Oriented Programming: An Introduction, Osborne McGraw-Hill, 1991;
11. PARV, B., VANCEA, A.: Fundamentele limbajelor de programare, Ed.Microinformatica, 1996;

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

- The content of the discipline is adapted and satisfies the requirements imposed on the labor market, being agreed by the social partners, professional associations and employers in the field related to the license program. The content of the discipline is found in the curriculum of the Electromechanics specialization and from other university centers in Romania that have accredited this specialization, so the knowledge of the basic notions is a stringent requirement of the employers in the field. For a better adaptation to the requirements of the labor market of the content of the discipline, meetings were held both with representatives of the business environment and with teachers from pre-university education.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Oral examination	The evaluation can be done face-to-face or online. Oral examination of students	75 %
10.6 Laboratory	Final evaluation test and free presentation of the report in ppt format.	The evaluation can be done face-to-face or online. Oral examination of students	25 %

10.8 Minimum performance standard:

- Carrying out the works under the coordination of a teacher, in order to solve specific problems in the IT field with the correct evaluation of the workload, resources available for the necessary time to complete the risks, under the conditions of application of occupational safety and health norms.

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				COMPUTER AIDED GRAPHICS II			
2.2 Holder of the subject				head of works dr.eng. SEBEŞAN RADU			
2.3 Holder of the academic seminar/laboratory/project				head of works dr.eng. SEBEŞAN RADU			
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Vp	2.7 Subject regime	Fundamental Discipline 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	hours
Study using the manual, course support, bibliography and handwritten notes	25
Supplementary documentation using the library, on field-related electronic platforms and in fieldrelated places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
Examinations	2
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) - Technical drawing, Electrotechnical materials, Electrical equipment, Electric machines;
4.2 related to skills	- Knowledge of symbols, graphics, specific to electrical schemes.

5. Conditions (where applicable)

5.1. for the development of the course	Video projector, computer.
5.2.for the development of the academic seminary/laboratory/project	- The equipment related to the laboratory class; - Preparation of the report, knowledge of the notions included in the laboratory work to perform it (synthesis material); - Carrying out all laboratory work. Face to face and online

6. Specific skills acquired	
Professional skills	- C2. Use of fundamental concepts of computer science and information technology - C4. Design of electrical systems and their components
Transversal skills	- CT3. Effective use of information and communication sources and assisted professional training (Internet portals, specialized software applications, databases, online courses etc.) both in Romanian and in a 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	□ "Graphics Assisted by Computer II" is the general technical discipline, compulsory in the formation of future engineers. Its aim is to acquire fundamental knowledge of engineering graphics, the universal language of communication in the technical field;
7.2 Specific objectives	□ Considering the field of "Electrical Engineering", the students to whom it is addressed, the course "Graphics Assisted by Computer II" proposes a study on the most modern electrical and electronic schemes. In most cases, electronic installations occurred in those areas where conventional installations did not respond or were given, could only be partial, demanding and without ensuring a high quality. For this reason, each chapter insists on the advantages and disadvantages of each type of electrical and electronic schemes by using computer-aided graphics. □ The laboratory work follows the actual study of electrical and electronic schemes with the help of OrCAD and Electronics Workbench. Knowledge and observance of technical legislation, in areas of specialty in general and in the electrical field in particular, is an essential requirement for conducting in good technical and economic conditions the safety of specific activities

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations

Chapter 1. Introductory computer-aided graphics 1.1. Integration of CAE-CAD-CAM components 1.2. CAD software package categories 1.3. CAD Resources for Internet 1.4. Manufacturers and CAD software	• Video projector; • Courses take place by teaching subjects and engaging students in dialogues. Intercalated student contributions are requested on subject-specific subjects.	4
Chapter 2. The graphic elements in the realization of electrical and electronic projects with the help of the computer 2.1. Automatic Electronic Design (EDA) 2.2. Electronic Documentation 2.3. Conventional signs used in electrical and schemes	Idem	4
Chapter 3. Basic rules in the representation of computer and electrical schemes 3.1. Conditions imposed on control systems 3.2. System flexibility and order convenience	Idem	4
Chapter 4. Electrical schemes. Computer-aided graphic representation methods 4.1. Electrical schemes 4.1.1.Explicative (functional, circuit, equivalent) 4.1.2. Connection (external, internal, terminals) 4.1.3. Location	Idem	4
Chapter 5. Presentation of the OrCAD program 5.1. Overview of the OrCAD software package 5.1.1. OrCAD Capture 5.1.2. OrCAD Layout	Idem	4
Chapter 6.. Creating the OrCAD Capture PC Board Wizard project 6.1 Launch of the Orcad Capture program and the project management application.	Idem	4
Chapter 7. Presentation of the Electronics Workbench program 7.1.Electronics Workbench program menu, editing the electronic drawing	Idem	4

Bibliography

Bibliography

1. Durgău, M., Sebeşan, R., - Technical drawing in electrotechnics, Ed. Of the University of Oradea, 2006.
2. Dolga, Lia, - Technical drawing for electrotechnics, Ed. Politehnica Timisoara, 2002.
3. Segal L., Ciobanasu G.,- Engineering Graphics, Tehnoexpres Iasi, 2003.
4. Simion, I., - AutoCAD 2007 for Engineers, Ed. Theory Teora, 2007.
5. R. Păunescu - Technical and Infographic Drawing - Ed. Of the University of.Brasov, 2006.
6. M.Durgău, R.Sebeşan - Graphic Design and Computer Assisted Design, Litogr.,2011.

8.2 Laboratory	Teaching methods	No. of hours/ Observations

1. Using OrCAD Capture - the OrCAD Capture program name, editing the electrical scheme.	For laboratory applications, students will have written materials presenting how to practice. The applications contain written, concrete instructions as well as general information about new orders. For practical applications, students will use the computer network and the Orcad Capture, Electronics Workbench program in the laboratory.	6
2. Graphic examples of functional schemes made with OrCAD Capture.	Idem	2
3. Graphic examples of circuit schemes made with OrCAD Capture.	Idem	2
4. Graphic examples of equivalent schemes made with OrCAD Capture.	Idem	2
5. Schematics of external, internal or OrCAD Capture terminals.	Idem	2
6. Orcad Capture electric drive schemes.	Idem	4
7. Using Electronics Workbench - the Electronics Workbench program name, editing the electrical layout	Idem	4
8. Graphic examples of electronic schemes made with Electronics Workbench	Idem	4
9. Final check	Teaching laboratories by supporting them;	2

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

The content of 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	• Ability to work with specialists from diverse fields to develop complex projects; • Formation and development of spatial thinking capacity in the shaping of industrial electrical schemes and graphic skills necessary for the correct execution of an electrical scheme. • Acquiring basic knowledge for using specific design programs - OrCAD Capture, Electronics Workbench with other utilities related to: databases. Acquiring computer-aided engineering graphics; - Participation in at least half of the courses. -	-Verification The discipline ends at the end of the second semester. Minimum promotion mark = 5, with both components = 5 (course + lab) Examination module: Partial tests based on tests / homeworks. Overall rating; Applications - Practical (duration 1 hour). Theory / Writing (duration 1 hour) Structure of topics: Test with questions in the course theme.	60%
10.6 Laboratory	The ability to draw a technical drawing according to technical standards with the help of OrCAD Capture, Electronics Workbench. - Participation in all laboratory work	Test + practical application Creating an execution drawing in OrCAD Capture, Electronics Workbench. Each student receives a grade for laboratory work during the semester and for the laboratory work. This results in a laboratory average.	40 %
10.8 Minimum performance standard: - Undertaking coordinated work to solve specific problems in the field, with the correct assessment of the workload, the available resources, the time required to complete and the risks, under the conditions of the application of the safety and health rules at work. Solving relevant applications for processing and representing data specific to electrical engineering.			

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUȘ / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**ELECTROMAGNETIC FIELD THEORY**				
2.2 Holder of the subject			prof.Phd.ing.habil. Hathazi Francisc – Ioan				
2.3 Holder of the academic seminar/laboratory/project			Associate prof. Phd.ing. Vasile Darie Șoproni /Lecturer. ing. Marius Codrean/ -				
2.4 Year of study	I	2.5 Semester	Ii	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DD

DF-Fundamental Discipline

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

3.1 Number of hours per week	5	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	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	hours
Study using the manual, course support, bibliography and handwritten notes	25
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	25
Tutorials	5
Examinations	10
Other activities.	

3.7 Total of hours for individual study	**80**
3.9 Total of hours per semester	**150**
3.10 Number of credits	**6**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Knowledge of physics, mathematical analysis
4.2 related to skills	Adequate application of fundamental knowledge of mathematics, physics, chemistry, specific, in the field of electrical engineering

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online. Laptop, video projector, magnetic board, free speech.
5.2.for the development of the academic seminary/laboratory/project	The seminar can be held face-to-face or online. / The lab can be conducted face-to-face or online. Computer network with workstation for each student, access to software that is studied during the course, network access to the internet /-

6. Specific skills acquired

Professional skills	• C2.1 - Analysis of simple DC and AC electrical circuits; • C2.2. - Modelling and design of electrical systems in electrical power applications, also called hard current applications, which concern the generation, transmission, distribution of electrical energy • C2.3 - Uses of modelling and design of electrical systems in telecommunication and electronic applications, also called weak current applications, relating to the generation, processing, transmission and reception of information-bearing signals. • C2.4 - Correctly solve and understand the operation of various electrical schemes. • C2.5. - The knowledge acquired is useful in solving problems faced by an electrical engineering specialist.

Transversal skills	- C2.1 - Analysis of simple DC and AC electrical circuits; - C2.2 - Modelling and design of electrical systems in power generation applications, also known as hard current applications, which relate to the generation, transmission, distribution of electrical energy - C2.3 - Uses of modelling and design of electrical systems in telecommunications and electronics applications, also called weak current applications, relating to the generation, processing, transmission and reception of information-bearing signals. - C2.4 - Correctly solve and understand the operation of various electrical schemes. - C2.5 - The knowledge acquired is useful in solving problems faced by an electrical engineering specialist.

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

7.1 The general objective of the subject	• The "Electromagnetic Field Theory" course aims to present electromagnetic phenomena from the point of view of their applications in engineering and is addressed to students in the field of electrical engineering, specializing in ELECTROMECHANICS (at Beiuș). Being a fundamental discipline, its object is to present in a unified framework some calculation methods of general interest, necessary to solve various problems specific to classical or modern electrical engineering. The laboratory activity is focused on specific applications of the chapters taught in the course and aims at the formation of calculation skills. In addition to the training of electrical skills, the laboratory work offers the use of physical and numerical modelling, the dimensioning of assemblies, the correct use of measuring equipment and the evaluation of errors in experimental determinations.
7.2 Specific objectives	• The lab is designed to give future engineers practical computer skills. The content of the labs presented is based on the need to deepen and explain in practice the problems presented in the course. Students have the opportunity to identify specific problems discussed during the course, familiarizing themselves with modern working tools. They will understand the complexity of this discipline. The knowledge is useful in the formation of skills in dealing with specific problems faced by a specialist in this field.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 1. INTRODUCTORY NOTIONS - Electromagnetic phenomena. Theory. Theoretical models in scientific knowledge - Some basic concepts. Theories of electromagnetic phenomena. - Object and content of the course	Laptop, video projector, IQ Board, free speech	3
CHAPTER 2. ELECTROMAGNETIC FIELD IN ELECTROSTATIC REGIME Electrostatic field in vacuum: -Electrification and electric field. Electric charge and electric field strength -Point charge field. Electric field produced in electrified bodies placed in vacuum -Electric field lines. Gauss's theorem. Electrostatic potential theorem. Electrical voltage - Electrostatic field equations in vacuum	Laptop, video projector, IQ Board, free speech	3
Electrostatic field in bodies. - Electric dipole. Polarization of molecules - Conductive media in electrostatic field. Polarization of dielectrics. Polarization vector - Law of temporary electric polarization. Electric induction vector. Law of electric flux	Laptop, video projector, IQ Board, free speech	3
- The law of connection between $\overline{D}$, $\overline{E}$ and $\overline{P}$. Equations of the stationary electric field in dielectric media - The dielectric squeezing. Dielectric strength	Laptop, video projector, IQ Board, free speech	3
Some theorems of electrostatics - Continuity theorems. Refraction theorem of electric field lines. Electric capacity theorem. Calculation of the capacitance of simple systems. - The triangle-stellar and inverse transfiguration theorem of capacitors - Capacitor networks - Energy theorem and forces in electrostatic field	Laptop, video projector, IQ Board, free speech	3
CHAPTER 3. ELECTROMAGNETIC FIELD IN ELECTROKINETIC REGIME General. Effects of electrokinetics	Laptop, video projector, IQ Board, free speech	3

- The intensity of the electric conduction current - Electric conduction current density. Law of conservation of free electric charge - Consequences of the law of conservation of free electric charge		
- Printed electric field - Law of electrical conduction - Variation of the resistivity of conductors with temperature. Superconductivity - Relaxation theorem	Laptop, video projector, IQ Board, free speech	3
- Law of transformation of electromagnetic energy by electric conduction currents - Equations of the stationary electrokinetic field - Continuity theorems. Refraction theorem. Uniqueness theorem for the determination of stationary electrokinetic fields. Superposition theorem of stationary electrokinetic fields	Laptop, video projector, IQ Board, free speech	3
- Resistance theorem. Resistor with homogeneous field. Cylindrical resistor. Hemispherical resistor. - Joule-Lenz effect developed in a resistor. - Correspondence theorem between electrostatic fields and stationary electrokinetic fields	Laptop, video projector, IQ Board, free speech	3
CHAPTER 4. THE ELECTROMAGNETIC FIELD IN A STATIONARY MAGNETIC REGIME. - Stationary magnetic field in vacuum. Weighted field actions. Magnetic induction vector o Biot-Savart relation. Superposition theorem. Magnetic flux law o Magnetic field strength. Ampere's theorem - Magnetic field equations in vacuum	Laptop, video projector, IQ Board, free speech	3
- Stationary magnetic field in bodies. State of magnetization. Magnetisation vector o Law of temporary magnetization o The law of connection between $\bar{B}$, $\bar{H}$ and $\bar{M}$ o Characteristic properties of ferromagnetic media - Equations of the stationary magnetic field in magnetic media	Laptop, video projector, IQ Board, free speech	3
- Continuity theorems. Refraction theorem of magnetic field lines - Inductivities. Energy and forces in magnetic field - Magnetic circuits	Laptop, video projector, IQ Board, free speech	3
CHAPTER 5. GENERAL LAWS OF ELECTROMAGNETIC PHENOMENA - Law of magnetic circuit - Integral form of the law of magnetic circuit - Differential form of the magnetic circuit law - Law of electromagnetic induction - Experimental basis of the phenomenon of electromagnetic induction - Integral form of the law of electromagnetic induction	Laptop, video projector, IQ Board, free speech	3
- Differential form of the law of electromagnetic induction - Lenz's rule - Applications of the electromagnetic induction phenomenon - Energy transmitted by electromagnetic waves. Propagation of electromagnetic energy - The case of direct plane waves - The general case of electromagnetic energy propagation	Laptop, video projector, IQ Board, free speech	3

Bibliography

1. Hathazi Francisc Ioan - Course material under editing
2.Daba, D., Constantin, E. - Electrotehnica, vol.I, Instit. Politehnic "Traian Vuia" Timișoara, 1973
2. Leuca, T. - Electric filiform circuits in stationary regime, Litografia Univ. of Oradea, 1993
3. Leuca, T., Maghiar, T. - Electrotehnică, Probleme, vol.IV, Litografia Univ. of Oradea, 1994
4. Leuca, T. - Elements of electromagnetic field theory. Applications using computer techniques, University of Oradea Publishing House, 2002.
8. Maghiar, T., Leuca, T. - Electrotehnica, Probleme vol.III,, Litografia Universității din Oradea, 1993
9. Mocanu, C. I. - Electromagnetic field theory, Ed. Didactica and Pedagogica, Bucharest, 1981

11. Preda, M., Cristea, P., Spinei, F. - Fundamentals of Electrical Engineering, vol. I-II, Ed. Didactica and Pedagogica, Bucharest, 1980
13. Răduleț, R. - Theoretical bases of electrical engineering, vol. I,II,III,IV, Ed. Energetica de Stat, Bucharest, 1954-1956.
14. Simion, E., Maghiar, T. - Electrotehnică, Ed. Didactica e Pedagogica, Bucharest, 1981
15. Șora, C. - Fundamentals of Electrical Engineering, Ed. Didactica and Pedagogica, Bucharest, 1982
16. Timotin, A. - Lecții de bazele electrotehnicii, Ed. Didactica and Pedagogica, Bucharest, 1970

8.2 Seminar	Teaching methods	No. of hours/ Observations
1. Electromagnetic quantities, units of measurement and elements of vector calculus.	Free speech, Blackboard	1
2. Solving steady-state electromagnetic field problems	Free speech, Blackboard	1
3. Solving electromagnetic field problems in the electrokinetic regime	Free speech, Blackboard	1
4. Solving capacitor networks	Free speech, Blackboard	1
5. Solving linear electric circuits	Free speech, Blackboard	1
6. Solving steady-state electromagnetic field problems in vacuum	Free speech, Blackboard	1
7. Solving steady-state electromagnetic field problems in bodies	Free speech, Blackboard	1

Bibliography

1. Hathazi Francisc Ioan - Course material under editing
2.Daba, D., Constantin, E. - Electrotehnica, vol.I, Instit. Politehnic "Traian Vuia" Timișoara, 1973
2. Leuca, T. - Electric filiform circuits in stationary regime, Litografia Univ. of Oradea, 1993
3. Leuca, T., Maghiar, T. - Electrotehnică, Probleme, vol.IV, Litografia Univ. of Oradea, 1994
4. Leuca, T. - Elements of electromagnetic field theory. Applications using computer techniques, Editura University of Oradea, 2002.
5. Leuca, T., Molnar Carmen - Electric circuits. Applications using computer techniques, University of Oradea Publishing House, 2002.
6. Maghiar, T., Leuca, T. - Culegere de probleme de electrotehnică, vol.I, Litografia Universității de Oradea, 1992
7. Maghiar, T., Leuca, T. - Culegere de probleme de electrotehnică, vol.II, Litografia Universității din Oradea, 1992
8. Maghiar, T., Leuca, T. - Electrotehnică, Probleme vol.III,, Litografia Universității din Oradea, 1993
9. Mocanu, C. I. - Electromagnetic Field Theory, Ed. Didactica and Pedagogica, Bucharest, 1981
10. Mocanu, C. I. - Theory of electrical circuits, Ed. Didactica and Pedagogica, Bucharest, 1979
11. Preda, M., Cristea, P., Spinei, F. - Fundamentals of Electrical Engineering, vol. I-II, Ed. Didactica and Pedagogica, Bucharest, 1980
12. Preda, M., Cristea, P. - Analysis and synthesis of electrical circuits, Ed. Tehnică București, 1968
14. Simion, E., Maghiar, T. - Electrotehnică, Ed. Didactica and Pedagogica, Bucharest, 1981
15. Șora, C. - Fundamentals of Electrical Engineering, Ed. Didactica and Pedagogica, Bucharest, 1982
17. Leuca, T. - Bazele electrotehnicii - îndrumător de laboratorio, litografiat Univ. Oradea, 1991

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Instructions on work safety technique	Free speech	2
2. Magnetic devices.Magnetic field.	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2
3. Magnetic curves. Magnetic field strength.	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2
4. Lenz's laws. Faraday's laws.	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2
5. Ampere's laws. Fleming's laws.	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2
6. Self induction.	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2
7. Verification of the acquired knowledge and conclusion of the laboratory situation	Free speech, use of PU2000 workstations and DEGEM software using the laboratory's computer network	2

Bibliography

1. Șoproni D., Maghiar T., Silaghi M., Pantea M. - Electrical engineering and electrical machines - laboratory guide, 2003

2. Maghiar, T., Leuca, T., Silaghi, M., Coroiu, L. - Linear direct current circuits - laboratory guide, lithographed University of Oradea, 1995

3. Molnar Carmen, Arion M. - Electrical engineering. Practical applications - University of Oradea Publishing House, 200

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 adapted to and meets the requirements of the labour market, being agreed by social partners, professional associations and employers in the field of the degree programme. The content of the subject is found in the curriculum of the ELECTROMECHANICS specialization (at Beiuș) and in other university centres in Romania that have accredited this specialization, so the knowledge of the basic notions is a stringent requirement of employers in the field. In order to better adapt the content of the subject to the labour market requirements, meetings were held with representatives of the business environment and with teachers from pre-university education.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Oral examination	The assessment can be face-to-face or online. Oral examination of students	75%
10.5 Seminar	Final assessment testv	Assessment can be face-to-face or online. Oral assessment - test, report.	15%
10.6 Laboratory	Final assessment test.	Assessment can be face-to-face or online. Oral assessment - test, report.	10%

10.8 Minimum performance standard:

- Carrying out work under the coordination of a teacher, in order to solve specific problems in the field of computer science with the correct evaluation of the workload, available resources and the time required to complete the risks, under the conditions of the application of occupational health and safety rules.

Note components: Exam (Ex), Laboratory (L).

- Grade calculation formula: $N = 0.75Ex + 0.25L$;
- Credit condition: $N \geq 5$, $L = \geq 5$

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Electrotechnic materials**					
2.2 Holder of the subject		Lecturer dr.ing. Claudia Olimpia Stașac					
2.3 Holder of the academic seminar/laboratory/project		Lecturer dr.ing. Claudia Olimpia Stașac					
2.4 Year of study	1	2.5 Semester	2	2.6 Type of the evaluation	Ex - Examination	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	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					69hours
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					20
Tutorials					5
Examinations					4
Other activities.					-
3.7 Total of hours for individual study	**69**				
3.9 Total of hours per semester	**125**				
3.10 Number of credits	5				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) -*Electromagnetic field theory, Physics, Mathematics*
4.2 related to skills	-Knowledge of electrical symbols, electrical diagrams, use of measuring devices, properties of materials.

5. Conditions (where applicable)

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

	laboratory work to be carried out (synthesis material); - Performing all the laboratory work.
6. Specific skills acquired	
Professional skills	- C1. Proper implementation of specific fundamental knowledge of mathematics, physics, chemistry, in the field of electrical engineering - C3. Use of fundamental knowledge of electrotechnics - C6. Diagnosis, troubleshooting and maintenance of electrical systems and components
Transversal skills	

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

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

8. Contents*

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

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

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

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

	determinations - Interpretation of the results obtained.	
3. Study of volume resistivity.	idem	2
4. Study of surface resistivity	idem	2
5. Study of materials for contacts	idem	2
6. Dynamic study of brushes for electric machines	idem	2
7. Determination of dielectric rigidity in electro-insulating oils	idem	2
8. Determination of dielectric rigidity in solid dielectrics	idem	2
9. Determination of dielectric rigidity in gaseous dielectrics	idem	2
10. Study of viscosity of liquid dielectrics	idem	2
11. Study of Hygroscopicity.	idem	2
12. Determination of the characteristic of varistors.	idem	2
13. Study of the influence of temperature on photovoltaic cells.	idem	2
14 Evaluation of laboratory activity. End of the situation	14 Evaluation Teaching of laboratories and their support; Remaining lab recovery.	2

Bibliography

[1] D.A. Hoble – Applications in the study of electrical materials - University of Oradea Publishing House 2017 ISBN 978-606-10-1879-6
[2]. D. Hoble – Electrotechnical Materials – University of Oradea Publishing House 2004 ISBN 973-613-579-9
[3] D. Hoble - Electrotechnical Materials -Laboratory Advisor- U.O.-1998
[4] Rodica Hella – Electronic Component Materials- Ed. MatrixRom Bucharest 2003
[5] Petre Notingher - Electrotechnical Materials. Uses. Ed. Politahnica Press - 2005

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	-- For note 5: all subjects must be treated to minimum standards; - For grades >5 all subjects must be treated proportionally according to the scoring scale.	Written, oral or on-line examination	75 %
10.6 Laboratory	-- All laboratory work must be carried out, which is a condition to enter the exam.	Knowledge assessment test	25 %
10.8 Minimum performance standard: Performing work under the coordination of a teacher, to solve problems specific to the study of electrical equipment and maintenance, maintenance and diagnosis of electrical equipment with the correct evaluation of workload, available resources, time of completion and risks, under conditions of application			

of occupational safety and health rules. After the promotion of the discipline, the student must have the ability to understand the mechanisms of the main phenomena that take place at the level of the structure of electrotechnical materials, their main properties, so that he can choose the right meter in the various practical engineering applications.

Completion date 25.08.2023 | Course owner's signature | Signature of the laboratory owner

Lecturer. dr. ing. STAȘAC CLAUDIA OLIMPIA | Lecturer dr. ing. STAȘAC CLAUDIA OLIMPIA

Date of endorsement in theElectrical Engineering department:

29.08.2023 | Lecturer dr. ing. Arion Mircea Nicolae

Date of endorsement in the Faculty Board:
29.09.2023 | Prof.univ.dr.ing.habil. Hathazi Francisc Ioan

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	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUȘ / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Elements of mechanical engineering**				
2.2 Holder of the subject			As. S.l. Codreanu Octavia				
2.3 Holder of the academic seminar/laboratory/project			As. S.l. Codreanu Octavia				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Vp	2.7 Subject regime	DD

DF-Fundamental Discipline

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

3.1 Number of hours per week	3	of which: 3.2 course	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	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	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
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	Basic mathematics and technical-mechanical physics, information and documentation of the use of basic computer technologies.

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face-to-face or online - Students will not attend lectures, seminars/labs with their mobile phones open. Also, phone calls during the course will not be tolerated, nor will students leaving the lecture room to take personal phone calls; - Tardiness of students to class and seminar/lab will not be tolerated as it is disruptive to the educational process;
5.2.for the development of the academic seminary/laboratory/project	-The deadline for the seminar paper is set by the holder in agreement with the students. Requests for postponement will not be accepted. for reasons other than objectively justified. -The lab can be conducted face-to-face or online

6. Specific skills acquired

Professional skills	C3. Appropriate application of knowledge of energy conversion, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipment and electromechanical drives. C3.4 Assess the quality and functional performance of electromechanical systems using methods C3.5 Design electromechanical or electrical installations C.6 Diagnose, troubleshoot and maintain electromechanical components and systems C6.2 Identify and select components for operation, maintenance and integration into electromechanical systems C6.3 Commissioning, operational testing, fault analysis and troubleshooting of electromechanical systems
Transversal skills	

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

7.1 The general objective of the subject	• To use the art of engineering as a tool of technical compromise.
7.2 Specific objectives	• Understanding the complexity of engineering as an interdisciplinary interweaving in assembly .

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1.Fundamentals of vector calculus, basic elements. 1.1 Classifications, terminology and definitions. 1.2.Basic operations, analytical expressions. Geometric definition of vectors by related analytic relations, modulus, direct cosines.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
2. Definition of triorthogonal reference systems and particular systems. 2.1. Definition of operations between vectors on the reference system under consideration. 2.2.Fundamental technical applications for the defined notions, torsor of a force.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
3. Fundamentals of material point kinematics. 3.1.Definition of position vector, properties, analogical relations. 3.2. Mathematical determination of the instantaneous velocity of the material point. 3.3. Analytical relations related to the velocity vector.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
4. Technical applications in practical speed determination. 4.1.Study of the radar operating principle in relation to the position vector properties, requirements of the assistance software. 4.2 Calculation of the motion trajectory of a material point - analogy with similar radar metric in describing the trajectory of the tracked point.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
5. Kinematic analysis of fundamental mechanisms . 5.1.Analysis of the movement of the crank-rod mechanism, determination of the harmonics of the speed of movement of the piston-slide. Phasors of motion. 5.2 Threaded transmission, components of movement	Animated presentation of the described effects studied, PC and overhead projector.	2
6. Calculation of the acceleration vector based on the position vector. 6.1 Establish the analytical expression and geometric-physical meaning of the second-order derivative of the position vector. 6.2 Technical applications, determination of kinematic parameters for motions; circular, elliptical, helical.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
7. Homogeneous transformations between reference systems. 7.1 Definition of direct and inverse transformations for versors. 7.2 Analytic transformations of position vectors and coordinates of a material point.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
8. Shape of the rotation matrix and particular cases. 8.1 Orthogonality of rotation matrix properties, minimum number of independent directrixes.	Thematic lectures with clarifications, explanations and demonstrations related	2

8.2 Applications to the study of vertex transformations between plane systems rotated with respect to each other, coordinate transformation and geometric motivation.	to the notions studied theoretically.	
9. Elements of relative motion. 9.1 Modelling relative motion, fixed and moving reference systems. 9.2 Derivatives of the derivative of a moving reference system, Poisson relations and the Poisson vector. 9.3 Absolute and relative derivatives of a moving vector.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
10. The study of relative motion in the general case. 10.1 Determination of position vectors of the velocity of the point being tracked, analytical relations. 10.2 Determination of acceleration and its components. 10.3 Coriolis acceleration at the level of the Earth's motion.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
11. Technical effects of Coriolis acceleration and its implications for material point motion. 11.1 The stability of the trajectory of aircraft in relation to the Coriolis deflection produced by the motion of the earth. 11.2 The gyroscope and the physical-mechanical property of trajectory stabilisation.	Animated presentation of the described effects studied, PC and overhead projector.	2
12. Fundamentals of kinematics of mechanical transmissions. 12.1 Threaded transmissions, classifications, properties and uses. 12.2 Evolving gear drives. Definition of involute, mutual winding profiles, gear ratios. 12.3 Special transmissions used in fine mechanics.	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
13. Basic elements of technical assemblies. 13.1 Nominal design and actual dimensions for a landmark. 13.2 Definition of upper and lower deviation for the given nominal size 13.3 Establishment of tolerance for bore and shaft type bearings, simplified representation schemes	Thematic lectures with clarifications, explanations and demonstrations related to the notions studied theoretically.	2
14. Fundamental criteria for the formation of technical fits - bore shaft assemblies. 15. Recapitulative notes on the material covered.	Overhead projector and PC pt Summary and recapitulative.	2

Bibliography

1. Stoian, Leonard. a.s. Materials Technology, E.D.P. Bucharest, 1980.
2. Felea, Ioan. Reliability engineering in electroenergetics, E.D.P. R.A.București,1996.
Suzana, Gâdea, Petrescu, M. Physical metallurgy and the study of metals, E.D.P.București1981, vol.I-II.
4. Mihalcu, M. Materials plastics reinforced, E.T. București. 1986,
5. Nădășan, Nt. Tests and analysis of metals, E.T. Bucharest, 1985.
6. Olszak, W. Theory of plasticity, E.T. Bucharest, 1986.
7. Deliman, Titus. Mechanical Engineering, E.U.O., Oradea, 2000.
8. Deliman, Titus. Mechanical Engineering. Laboratory guide, E.U.O. Oradea, 2000

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Analysis of the kinematic process of roto-translation - cycloid. Calculation of the velocity, drawing up the variation diagram for the velocity. Determination of the distribution of the viscera. Observations on the plane rolling process.	Presentation of the theoretical support, description of the phenomenon. Individual calculation and plotting	2
2. Calculation of the acceleration vector for plane rolling, plotting of the variation of the total acceleration components, conclusions.	Presentation of the theoretical support, description of the phenomenon. Individual calculation and plotting	2
3. Determine by calculation the trajectory of a fixed point of a rolling circle, drawing a diagram illustrating the trajectory of the point. Calculate the length of the given trajectory.	Presentation of the theoretical support, description of the phenomenon. Individual calculation and plotting	2
4. Draw up graphs of the variation of the speed and acceleration of the crank mechanism. Graphically assemble the diagrams corresponding to the first and second order harmonics	Presentation of the theoretical support, description of the phenomenon. Individual calculation and plotting	2

5. Kinematic and functional analysis of a screw-nut transmission, determination of the components of the movement - consequences	Presentation of the theoretical support, description of the phenomenon. Individual calculation and plotting	2
6. Relative motion of the material point - the Foucault pendulum. Effects of Coriolis acceleration on gravitational field motion.	Specification of theoretical elements course correlation. Experimental development.	2
7. Determination by direct measurement of the effective dimensions for two complementary landmarks, determination of the character of the fit, finding the tolerances necessary to maintain the type of fit.	Specification of theoretical elements course correlation. Experimental development.	2

Bibliography

1. Deliman, Titus. Mechanical Engineering, E.U.O., Oradea, 2000.

2. Deliman, Titus. Mechanical Engineering. Laboratory guide, E.U.O. Oradea, 2000.

Andrei Dobrescu. Curs de geometrie diferenială, EDP, revised edition Bucharest. 1990.

4. Gh. Silaș, I. Grosanu Mecanica. EDP. 1991.

5. Viorel, Handra-Luca. I. Stoica Introduction to Mechanics Theory. Dacia Publishing House. Cluj-Napoca. 1983.

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

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 course and the practical works present calculation methodologies and mathematical simulations in order to familiarize students with the approach of specific technical problems with interdisciplinary valences necessary for engineering approaches.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Theoretical knowledge accumulated and applications	On-the-spot check can take place in front of face-to-face or online	55%
10.6 Laboratory	Practical work of laboratory	Each work of lab work has a report attached which is marked	45%

10.8 Minimum performance standard:

- Attendance at a minimum of 80% of laboratory work (6 out of 7 practical assignments per semester) and handing in laboratory reports on time.
- Obtain a mark of 6 in the practical co-occurrence and a mark of 5 in the Vp

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1^{st} cycle)
1.6 Study program/Qualification	Electromechanics Beius / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Equations of mathematical physics**						
2.2 Holder of the subject	Conf.univ. dr. ing. GRAVA ADRIANA						
2.3 Holder of the academic seminar/laboratory/project	Conf.univ. dr. ing. GRAVA ADRIANA/-/-						
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Ex	2.7 Subject regime	DF

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

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

Distribution of time	69
Study using the manual, course support, bibliography and handwritten notes	15
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	18
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	18
Tutorials	4
Examinations	4
Other activities.	10

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	Special mathematics, mathematical analysis
4.2 Related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	The course could be physically or online
5.2.for the development of the academic seminary/laboratory/project	Seminary could be physically or online

6. Specific skills acquired	
Professional skills	*C1. Proper implementation of specific fundamental knowledge of mathematics, physics, chemistry, in the field of electrical engineering* *- C2. Use of fundamental concepts of computer science and information technology* *- C3. Use of fundamental knowledge of electrotechnics* *- C4. Design of electrical systems and their components*
Transversal skills	

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

7.1 The general objective of the subject	The student after this course acquires mathematical skills in solving problems of electric and electromagnetic field, the use of signals in time and frequency.
7.2 Specific objectives	After completing the course, the student must know how to use and apply mathematical formulas, within the studied chapters such as: symbolic analysis, partial differential equations, time and frequency analysis required for electrical engineering applications in the following disciplines to be performed during the 4 years of study.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Scalar fields. Vector fields.	Video projector, presentation, discussion	2h
2. Analysis of electrical signals over time. Applications with the 20 SIM simulation program.	Video projector, presentation, discussion	2h
3. Use of functions for modeling complex systems.	Video projector, presentation, discussion	2h
4. Methods of modifying equations. Applications with the 20 SIM simulation program.	Video projector, presentation, discussion	2h
5. Power and energy variables. Input sizes	Video projector, presentation, discussion	2h

6. Analysis of the system of equations for an electrical circuit	Video projector, presentation, discussion	2h
7. Modeling of direct current electrical circuits in the 20 Sim simulation program.	Video projector, presentation, discussion	2h
8. Making connection graphs for simple electrical circuits.	Video projector, presentation, discussion	2h
9. Procedures for constructing connection graphs for electrical circuits.	Video projector, presentation, discussion	2h
10. Checking the current and voltage characteristics for direct current electrical circuits using classical methods and simulation in 20 SIM.	Video projector, presentation, discussion	2h
11.Verification of Kirchhoff's Theorem I for direct current circuits by applying the simulation method in 20 SIM. Comparison of the results obtained in 20 SIM with the results obtained by the classical method.	Video projector, presentation, discussion	2h
12.Verification of Kirchhoff's Theorem II for direct current circuits by applying the simulation method in 20 SIM. Comparison of the results obtained in 20 SIM with the results obtained by the classical method.	Video projector, presentation, discussion	2h
13. Comparison of the results of some electrical circuits that are in direct current solved using the theorem of cyclic currents with simulation results using the connection graphs and the simulation program 20 SIM	Video projector, presentation, discussion	2h
14. Comparison of the results of some direct current electrical circuits solved using the potential theorem at nodes with simulation results using the connection graphs and the 20 SIM simulation program	Video projector, presentation, discussion	2h

Bibliography:

1. Grava A. - "Calculation methods for engineers" - University of Oradea Publishing House 2009;
2. Grava A. - www.agrava.webhost.uoradea.ro;
3. Grava A. - "Connection graphs in electrical engineering", University of Oradea Publishing House, 2004;
4. Grava A. - "Connection graphs in electrical engineering - Applications", University of Oradea Publishing House, 2009;
5. Moisil C.J. - "Physics for engineers", Vol 1,2, Bucharest Technical Publishing House, 1967;
6. Nicolescu L.O. - "Mathematics for engineers", Vol 1,2, Bucharest Technical Publishing House, 1971;
7. Popescu I. - "Physics", Vol 1,2, Didactic and Pedagogical Publishing House, Bucharest, 1982;
8. Rudner V. - "Problems of special mathematics", Didactic and Pedagogical Publishing House, Bucharest, 1982;
9. Şabac, I. Gh. - "Special Mathematics", Didactic and Pedagogical Publishing House, Bucharest, 1983;
10. Cărţianu Gh. - „Analysis and synthesis of electrical circuits" - Didactic and pedagogical publishing house - 1972.

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the 20 SIM simulation program	Simulasion or online	2h

	simulation	
2. Analysis of electrical signals over time. Applications with the 20 SIM simulation program.	Simulasion	2h
3. Use of functions for modeling complex systems.	Simulasion	4h
4. Methods of modifying equations. Applications with the 20 SIM simulation program.	Simulasion	2h
5. Power and energy variables. Input sizes	Simulasion	2h
6. Analysis of the system of equations for an electrical circuit	Simulasion	2h
7. Modeling of direct current electrical circuits in the 20 Sim simulation program.	Simulasion	2h
8. Making connection graphs for simple electrical circuits.	Simulasion	2h
9. Procedures for constructing connection graphs for electrical circuits.	Simulasion	2h
10. Checking the current and voltage characteristics for direct current electrical circuits using classical methods and simulation in 20 SIM.	Simulasion	2h
11.Verification of Kirchhoff's Theorem I for direct current circuits by applying the simulation method in 20 SIM. Comparison of the results obtained in 20 SIM with the results obtained by the classical method.	Simulasion	2h
12.Verification of Kirchhoff's Theorem II for direct current circuits by applying the simulation method in 20 SIM. Comparison of the results obtained in 20 SIM with the results obtained by the classical method.	Simulasion	2h
13. Comparison of the results of some electrical circuits that are in direct current solved using the theorem of cyclic currents with simulation results using the connection graphs and the simulation program 20 SIM	Simulasion	2h
14. Comparison of the results of some direct current electrical circuits solved using the potential theorem at nodes with simulation results using the connection graphs and the 20 SIM simulation program	Simulasion	2h

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

1. The content of the discipline is adapted and satisfies the requirements imposed on the labor market, being agreed by the social partners, professional associations and employers in the field related to the license program. The content of the discipline is found in the curriculum of the EM specialization and from other university centers in Romania that have accredited this specialization, so the knowledge of the basic notions is a stringent requirement of the employers in the field. For a better adaptation to the labor market requirements of the content of the discipline, meetings were held both with representatives of the business environment and with teachers from pre-university education.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course		Paper - oral presentation	70%
10.5 Laboratory	Laboratory Activity	Oral simulation presentation	30%
10.8 Minimum performance standard:			
Adequate use of basic knowledge of mathematics, physics, chemistry in developing a professional project of low complexity			
Final Periodic Verification (VPF) Seminar (S), Laboratory(L), Project (P). Grade calculation formula N = 70%Ex + 30%S; Condition for obtaining loans:: N ≥ 5; S = ≥ 5; L = ≥ 5; P = ≥ 5.			

Signature of the course holder

Completion date:
27.08..2023

Conf.univ.dr.ing. Grava Adriana Marcela

Date de contact:
Tel.: 0259 / 410.667, e-mail: agrava@uoradea.ro

Signature of the laboratory holder

Conf.univ.dr.ing. Grava Adriana Marcela

Date de contact:
Tel.: 0259 / 410.667, e-mail: agrava@uoradea.ro

Signature Departament Directory

Date of endorsement in the department:

29.08.2023

Şef.lucrari.dr.ing. Mircea Nicolae Arion

Date of endorsement in the department:

29.09.2023

Dean's Signature

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

Pagina web: http://ihathazi.webhost.uoradea.ro/

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject			**Linear algebra, analytic and differential geometry**				
2.2 Holder of the subject			Univ. Conf. dr. Alb Lupaş Alina				
2.3 Holder of the academic seminar/laboratory/project			Univ. Conf. dr. Alb Lupaş Alina				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DF

DF-Fundamental Discipline

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

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	17
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	2
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	
Examinations	4
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	The course can take place face-to-face or online
5.2.for the development of the academic seminary/laboratory/project	The seminar can be held face-to-face or online

6. Specific skills acquired

Professional skills	C1. Adequate application of fundamental knowledge of mathematics, physics, specific chemistry in the field of electrical engineering C1.1.Description of basic concepts, theories and methods of mathematics, physics, chemistry, suitable for the field of electrical engineering C1.2 Explanation and interpretation of phenomena presented in the field and specialized disciplines, using fundamental knowledge of mathematics, physics, chemistry C1.3.Application of general scientific rules and methods for solving problems specific to electrical engineering
Transversal skills	

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

7.1 The general objective of the subject	• Understand general notions in linear algebra, vector algebra, analytic geometry and differential geometry
7.2 Specific objectives	• To use the taught notions in solving engineering problems • To interpret and apply acquired notions

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Linear algebra	Lecture, problematization	
1.1. Matrix. Determinants. Systems of linear equations	Lecture, problematization	2
1.2. Vector spaces	Lecture, problematization	2
1.3. Inner product. Norm. Distance	Lecture, problematization	1
1.4. Eigenvalues and vectors. Cayley–Hamilton theorem	Lecture, problematization	2
1.5. Bilinear and quadratic shapes	Lecture, problematization	2
Chapter 2. Vector algebra	Lecture, problematization	
2.1. Segment oriented. Free vector	Lecture, problematization	1
2.2. Operations with free vectors. Free vector space	Lecture, problematization	1
2.3. Collinearity and coplanarity	Lecture, problematization	2
2.4. Products in V3	Lecture, problematization	2
Chapter 3. Analytical geometry	Lecture, problematization	
3.1. Coordinate systems	Lecture, problematization	1
3.2. Straight line and plane in space	Lecture, problematization	2
3.3. Distances and angles. Common perpendicular of two lines	Lecture, problematization	2
3.4. Tapered	Lecture, problematization	2
3.5. Quadrice	Lecture, problematization	2
Chapter 4. Differential geometry	Lecture, problematization	
4.1. Curves in plane and space	Lecture, problematization	2
4.2. Suprafeţe	Lecture, problematization	2

Bibliography

1. A. Alb Lupas, L. Andrei – Linear algebra, analytic and differential geometry, University of Oradea Publishing House, 2005
2. A. Alb Lupas, L. Andrei – Algebra and geometry for engineers, University of Oradea Publishing House, 2011
3. V. Crunceanu - Elements of linear analysis and geometry, EDP Bucharest 1973
4. Ion D. Ion, N. Radu - Algebra, EDP, Bucharest 1991
5. G. Ivan, M. Pirta - Elements of 3-dimensional algebra and analytic geometry, Univ Printing House Timişoara 1991
6. G. Ivan - Bases of linear algebra and applications, Ed Mirton, Timişoara, 1996
7. R. Miron - Introduction to differential geometry, EDP Bucharest 1971
8. I Corovei, V. Pop - Algebra problems, Univ Tehnica Cluj-Napoca 1995
9. C. Udriste - Applications of algebra, geometry and differential equations, EDP Bucharest 1993

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 1. Linear algebra	Problematization, modeling	
1.1. Exercises with matrix operations. Calculation of Determinants. Solving systems of linear equations	Problematization, modeling	1
1.2. Vector space exercises	Problematization, modeling	1
1.3. Calculation of inner product, norm and density in a vector space	Problematization, modeling	1
1.4. Determination of eigenvalues and vectors.	Problematization, modeling	1
1.5. Applications to bilinear and quadratic shapes	Problematization, modeling	1
Chapter 2. Vector algebra	Problematization, modeling	
2.1. Free vector operations	Problematization, modeling	1
2.2. Collinearity and coplanarity of vectors, exercises	Problematization, modeling	1
2.3. Calculation of products in V3	Problematization, modeling	1
Chapter 3. Analytical geometr	Problematization, modeling	

3.1. Problems for determining equations of lines and planes in space	Problematization, modeling	1
3.2. Calculation of distances and angles. Deterrmination of the common perpendicular of two lines	Problematization, modeling	1
3.3. Taper exercises	Problematization, modeling	1
3.4. Quadric exercises	Problematization, modeling	1
Chapter 4. Differential geometry	Problematization, modeling	
4.1. Determination of curves in plane and space	Problematization, modeling	1
4.2. Determination of areas	Problematization, modeling	1

Bibliography

1. A. Alb Lupas, L. Andrei – Linear algebra, analytic and differential geometry, University of Oradea Publishing House, 2005
2. A. Alb Lupas, L. Andrei – Algebra and geometry for engineers, University of Oradea Publishing House, 2011
3. V. Crunceanu - Elements of linear analysis and geometry, EDP Bucharest 1973
4. Ion D. Ion, N. Radu - Algebra, EDP, Bucharest 1991
5. G. Ivan, M. Pirta - Elements of 3-dimensional algebra and analytic geometry, Univ Printing House Timişoara 1991
6. G. Ivan - Bases of linear algebra and applications, Ed Mirton, Timişoara, 1996
7. R. Miron - Introduction to differential geometry, EDP Bucharest 1971
8. I Corovei, V. Pop - Algebra problems, Univ Tehnica Cluj-Napoca 1995
9. C. Udriste - Applications of algebra, geometry and differential equations, EDP Bucharest 1993

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 assessment can be done face-to-face or online	70%
10.5 Seminar		The assessment can be done face-to-face or online	30%

10.8 Minimum performance standard:

-

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUȘ / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Mathematical analysis**				
2.2 Holder of the subject			Univ. Conf. dr. Alb Lupaş Alina				
2.3 Holder of the academic seminar/laboratory/project			Univ. Conf. dr. Alb Lupaş Alina				
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DF

DF-Fundamental Discipline

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

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

Distribution of time	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	4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	
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	-
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	The course can take place face-to-face or online
5.2.for the development of the academic seminary/laboratory/project	The seminar can be held face-to-face or online

6. Specific skills acquired

Professional skills	C1. Adequate application of fundamental knowledge of mathematics, physics, specific chemistry in the field of electrical engineering C1.1.Description of basic concepts, theories and methods of mathematics, physics, chemistry, suitable for the field of electrical engineering C1.2 Explanation and interpretation of phenomena presented in the field and specialized disciplines, using fundamental knowledge of mathematics, physics, chemistry C1.3.Application of general scientific rules and methods for solving problems specific to electrical engineering C1.4.Appreciation of the quality, advantages and disadvantages of methods and procedures in the field of electrical engineering, as well as the level of scientific documentation of their projects and the consistency of programs using scientific methods and mathematical 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	• Understand general notions in mathematical analysis
7.2 Specific objectives	• To use the taught notions in solving engineering problems • To interpret and apply acquired notions

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Space R^n	Lecture, problematization	2
Chapter 2. Strings and series	Lecture, problematization	4
2.1. Real number strings and series	Lecture, problematization	2
2.2. Function strings and series	Lecture, problematization	4
Chapter 3. Boundaries and continuity	Lecture, problematization	4
Chapter 4. Differential calculations	Lecture, problematization	2
Chapter 5. Integral Riemann	Lecture, problematization	2
Chapter 6. Integration of functions of multiple variable	Lecture, problematization	2
6.1. Double integral	Lecture, problematization	2
6.2. Triple integral	Lecture, problematization	2
Chapter 7. Curvilinear integral	Lecture, problematization	2
Chapter 8. Surface integrals	Lecture, problematization	2
Recapitulate	Lecture, problematization	2

Bibliography

1. A. Alb Lupaş – Mathematical analysis. Probabilities, course notes, Oradea, 2009
2. M. Balaj, S. Drăgan, L. Popescu – Mathematical Analysis I, University of Oradea Publishing House, 1999
3. M. Balaj, S. Drăgan, L. Popescu – Mathematical Analysis II, University of Oradea Publishing House, 1997
4. D. Ionac, S. Mureşan, A.Alb, B. Bede – Mathematical Analysis – Collection of Problems, Brevis Oradea Publishing House, 2000
5. S. Chiriţă – Problems of Higher Mathematics, Ed. Did. and Ped., 1989
6. N. Donciu, D. Flondor – Algebra and Mathematical Analysis, Collection of Problems, Vol I,II, EDP, Bucharest, 1979
7. M. Roşculeţ – Collection of problems of mathematical analysis, EDP, Bucharest, 1968
8. M. Craiu, M. Roşculeţ – Collection of problems of mathematical analysis, EDP, Buc. 1976
9. Gh. Sireţchi – Differential and integral calculus, vol.II, ESE, Bucharest, 1985
10. L. Aramă, T. Morozan – Problems of differential calculus and integrals, Technical Publishing House, Bucharest, 1978
11. S. Găină, E. Câmpu, Gh. Bucur – Collection of differential and integral calculus problems, vol. II, III, E.T., Bucharest, 1966

8.2 Seminar	Teaching methods	No. of hours/ Observations
Chapter 2. Strings and series – applications	Problematization, modeling	
2.1. Calculating limits of strings and series of real numbers	Problematization, modeling	1
2.2. Determining the convergence of the strings and series of functions	Problematization, modeling	2
Chapter 3. The horse of function limits of several variables and determining the continuity of these functions	Problematization, modeling	2
Chapter 4. Differential calculus – applications: calculation of partial derivatives of order I and II of functions of several variables, determination of differentials of order I and II of a function of several variables, determination of points of extremes and points of conditional extremes of a function of several variables	Problematization, modeling	2
Chapter 5. Riemann integral – calculation of antiderivatives of functions of a real variable	Problematization, modeling	2
Chapter 6. Integration of functions of multiple variables – applications	Problematization, modeling	
6.1. Double integral – exercises: calculation of the double integral	Problematization, modeling	1
6.2. Triple integral – exercises: calculating a triple integral	Problematization, modeling	1

Chapter 7. Curvilinear integral – exercises: calculation of the first and second case curvilinear integral	Problematization, modeling	1
Chapter 8. Surface integrals – exercises: calculation of surface integrals	Problematization, modeling	1
Recapitulate	Problematization, modeling	1

Bibliography

1. A. Alb Lupaş – Mathematical analysis. Probabilities, course notes, Oradea, 2009
2. M. Balaj, S. Drăgan, L. Popescu – Mathematical Analysis I, University of Oradea Publishing House, 1999
3. M. Balaj, S. Drăgan, L. Popescu – Mathematical Analysis II, University of Oradea Publishing House, 1997
4. D. Ionac, S. Mureşan, A.Alb, B. Bede – Mathematical Analysis – Collection of Problems, Brevis Oradea Publishing House, 2000
5. S. Chiriţă – Problems of Higher Mathematics, Ed. Did. and Ped., 1989
6. N. Donciu, D. Flondor – Algebra and Mathematical Analysis, Collection of Problems, Vol I,II, EDP, Bucharest, 1979
7. M. Roşculeţ – Collection of problems of mathematical analysis, EDP, Bucharest, 1968
8. M. Craiu, M. Roşculeţ – Collection of problems of mathematical analysis, EDP, Buc. 1976
9. Gh. Sireţchi – Differential and integral calculus, vol.II, ESE, Bucharest, 1985 L.
10. Aramă, T. Morozan – Problems of differential calculus and integrals, Technical Publishing House, Bucharest, 1978
11. S. Găină, E. Câmpu, Gh. Bucur – Collection of differential and integral calculus problems, vol. II, III, E.T., Bucharest, 1966

* 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 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 assessment can be done face-to-face or online	70%
10.6 Laboratory		The assessment can be done face-to-face or online	30%

10.8 Minimum performance standard:

- Apply the basics learned to problems
- Attendance at least 70% of the total number of classes
- Attendance at all seminar classes

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 Electrical Engineering**
1.4 Field of study	**Electrical Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Electrical engineering/ Bachelor of Engineering**

2. Data related to the subject

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

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

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

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

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

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

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

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

8. Contents*

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

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

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

References:

Abrudan Simona Veronica, Bandici Adina, *Technical English for Electrical Engineering*, Editura Universității "Lucian Blaga" din Sibiu, 2016.
Abrudan Simona Veronica, *English for Computer Science Students*, Editura Universitatii din Oradea, Oradea, 2009
Abrudan Simona Veronica, '*English Practice. A Practical Course in English for Intermediary Students*', Editura Universitatii din Oradea, Oradea 2004
Abrudan Simona, Fazecas Eniko, Anton Anamaria, 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:
01.09.2023

Date of endorsement in the department:
18.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

FIŞA DISCIPLINEI

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	**Electrical Engineering**
1.4 Field of study	**Electrical Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study programme/Qualification	**Electromecanica Beius/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				Physics			
2.2 Holder of the subject				Lect. Dr. Beiuseanu Florian Georgian			
2.3 Holder of the academic seminar/laboratory/project				Lect. Dr. Beiuseanu Florian Georgian			
2.4 Year of study	I	2.5 Semester	I	2.6 Type of evaluation	EX	2.7 Subject regime	DF

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

3.1 Number of hours per week	3	3.2 Of which: Course	2	3.3Seminar/laboratory/project	1
3.4 Total hours from the curriculum	42	3.5 Of which: Course	28	3.6Seminar/laboratory/project	14
Distribution of time					h
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					
Examinations					4
Other activities.					4

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	(Conditionari)
4.2 related to skills	Basic notions of physics (high school), geometry, algebra, mathematical analysis

5. Conditions (where applicable)

5.1. for the development of the course	Classroom, video projector, internet, online
5.2.for the development of the academic seminary/laboratory/project	Seminar room, online

6. Specific skills acquired	
Professional skills	**C1. Adequate application of fundamental knowledge of mathematics, physics, specific chemistry in the field of electrical engineering** C1.1.Description of basic concepts, theories and methods of mathematics, physics, chemistry, suitable for the field of electrical engineering C1.2 Explanation and interpretation of phenomena presented in the field and specialized disciplines, using fundamental knowledge of mathematics, physics, chemistry C1.3.Application of general scientific rules and methods for solving problems specific to electrical engineering C1.4. Appreciation of the quality, advantages and disadvantages of methods and procedures in the field of electrical engineering, as well as the level of documentation and scientific documentationof projects and consistency of programs using scientific methods and mathematical techniques.

Competențe transversale	▪

7. The objectives of the discipline (based on the grid of specific competences acquired)

7.1 The general objective of the subject	Training competitive specialists in the field of electromechanical engineering and raise to a higher level the research activity in this field. The training of specialists of high performance and competence, with a good fundamental training in the field of engineering and management, but equally trained in related fields, so as to quickly integrate into the research activity or market economy, is achieved through a permanent collaboration with the profile companies in the area (city, county, neighboring counties).
7.2 Specific objectives	• preparing students as future specialists needed in an information society; • training of economic engineers for multidisciplinary research; • preparation for basic training in mechanical engineering, technological methods and procedures; • preparation for the use of general economy knowledge; • preparation for the design, implementation and use of production systems; • development of managerial communication capacities; • training for general, logistic and human resources management; • training for quality management, production and financial management; • preparation for configuration and implementation of electric drive systems and microprocessor systems; • preparation for knowledge of general elements of law, labor, business and international law; • preparation for drawing up and managing the execution of projects in the field of economic engineering, as well as in related fields; • deepening the principles of using management informatics and their application in the Romanian economy; • attracting an increased number of students from the country in this field that requires technical creativity, active spirit and enthusiasm; • training students so that they can easily adapt to the rapid changes taking place at technological and managerial level in today's economy; • opening the professional horizon through cooperation with profile faculties in the country and abroad; • creating opportunities for cooperation with economic units – in order to capitalize on the results of scientific research; • stimulating creative activities by stimulating participation in scientific events • publishing the most successful achievements and projects in prestigious magazines; • implementing and motivating the notion of team by approaching team projects;

8. Contents*

8.1 Course	Teaching methods	No. of Hours / Comments
Chapter 1. Elements of mechanics. 1.1 Kinematics of the material point. 1.2. The fundamental laws of material point motion. 1.3. Mechanical work. Mechanical energy. Mechanical power.	-Lecture -Debate - problematization - exemplification	2
1.4. Theorem of variation of kinetic energy. Law of conservation of mechanical energy. 1.5. Particular cases of material point motion. 1.6.Movement in a uniform force field.	-Lecture -Debate - problematization - exemplification	2
1.7. Motion in a uniform force field in resistive medium. 1.8. Conservative field movement of elastic forces. Simple harmonic	-Lecture -Debate	2

movement.	- problematization - exemplification	
1.9.Damped harmonic motion.1.10 Maintained harmonic motion.1.11 Composition of harmonic oscillations. 1.12.Propagation of oscillations in elastic media.	-Lecture -Debate - problematization - exemplification	2
1.13.Elastic waves. Wave equation. Wave energy. Wave propagation equation. 1.14.Wave propagation in solid media.	-Lecture -Debate - problematization - exemplification	2
Chapter 2. Notions of thermodynamics.2.1. Overview. 2.2.General principle of thermodynamics.2.3. The first principle of thermodynamics. 2.4.Applications. 2.5.Adiabatic transformation.	-Lecture -Debate - problematization - exemplification	2
2.6.Second principle of thermodynamics. 2.7.Calculation of Carnot cycle efficiency. 2.8. Entropy. 2.9.Third principle of thermodynamics.	-Lecture -Debate - problematization - exemplification	2
Chapter 3. Electrostatics. 3.1. Electric field. 3.2. Electrical potential. 3.3. Electric flow. Gauss's theorem. 3.4. Electric dipole. 3.5. Electrokinetics. Electric current. 3.6.Ohm's Law. 3.7. Electrical conductivity	-Lecture -Debate - problematization - exemplification	2
Chapter 4. Magnetostatics. 4.1.Magnetic field. 4.2.Magnetic force. 4.3.Electrodynamic force. 4.4.Biot-Savart Law.4.5. Law of magnetic circuit.	-Lecture -Debate - problematization - exemplification	2
4.6.Magnetic flux.4.7. Gauss's theorem.4.8. Magnetic dipole.4.9. Magnetic dipoles of atoms.	-Lecture -Debate - problematization - exemplification	2
Chapter 5. Notions of electromagnetism. 5.1.Laws of electromagnetism. 5.2. Maxwell's equations, differential form, integral form.	-Lecture -Debate - problematization - exemplification	2
Chapter 6. Magnetic properties of substances. 6.1. Characteristic sizes of magnetic materials, susceptibility, magnetic permeability. 6.2. Diamagnetic substances. 6.3. Paramagnetic substances. 6.4. Ferromagnetic substances.	-Lecture -Debate - problematization - exemplification	2
Ch. 7. Optical. 7.1.Geometric optics. 7.1.1.Basic laws of geometric optics. 7.1.2. Laws of reflection. 7.1.3.Laws of refraction..	-Lecture -Debate - problematization - exemplification	2
7.1.4.Total reflection. 7.1.5.Flat mirror. 7.1.6.Spherical mirrors. 7.1.7.Blade with pear plane faces. 7.1.8.Optical prism. 7.1.9.Lenses. 7.1.10.Spherical diopter	-Lecture -Debate - problematization - exemplification	2

Bibliography

1. Ilie Ivanov - Classical physics - Theoretical bases and solved problems - university level -Printech Publishing House, Bucharest 2002.
2. Ilie Ivanov – Physics – Course, Matrix Publishing House –Rom. Bucharest, 2004.
3. Constantin P. Cristescu; Eugen I.Scarlat – Particle systems and thermodynamic systems.Editura CONPHYS, 1999.
4. Z.Gabos; O.Gherman – Thermodynamics is Statistical Physics, Didactic Publishing Pedagogica, Bucharest 1967.
5. Cornelia Motoc – Physics vol.2 – ALL Publishing House, Bucharest 1998.
6. Nicolae Barbulescu et al. – Kinetic-molecular theory of gases, Publishing House Scientific, Bucharest 1972.

7. C.N.Plavitu – Physics of thermal phenomena I, II, III, Hyperion XXI Publishing House, Bucharest 1994.
8. Max Born, Fizica atomica, Ed.Stiintifica 1970.
9. Ion M.Popescu, Physics Course, vol. I, Ed.Didactica şi Pedagogica, 1976.
10.C.Cristescu, Thermodynamics of Statistical Physics, IPB Lithograph, 1978.
11.G.Moisil, Physics for engineers, vol.2, Editura Tehnica, 1967.
12.A.Lupascu, Thermodynamics and Statistical Physics, Litografia IPB, 1991.
13.A Hristev, Mecanica si acustica, Editura didactica si pedagogica – Bucuresti 1984.

8.2 Seminar	Teaching methods	No. of Hours / Comments
1. Vectors. Vector calculus. Elements of vector analysis. Problems and exercises of kinematics of the material point	- problem solving -Exercise - explains.	2
2. Problems with the dynamics of the material point. Its mechanical energy, the variation of mechanical energy. Mechanical power.	- problem solving -Exercise - Explanation	2
3. Explaining, exemplifying mechanical waves. Calculation of wave-specific elements. Calculation of the speed of wave propagation in different media. General notions of thermodynamics. Replication of quantities specific to thermodynamics. Problems and exercises.	- problem solving -Exercise - Explanation	2
4. Problems related to general gas transformations, principle I and II, Carnot cycle.	- problem solving -Exercise - Explanation	2
5. Explanation of the basics of electrostatics. Determination of electric field and potential for different charge configurations. Problems.	- problem solving -Exercise - Explanation	2
6. Problems and exercises for determining magnetic induction generated by different currents. Determination of magnetic susceptibility and magnetization by different methods.	- problem solving -Exercise - Explanation	2
7. Problems and exercises related to reflection and refraction. Determination of images, focal lengths, etc. For different optical systems.	- problem solving -Exercise - Explanation	2
8.3 Laborator		
8.4 Project		

Bibliography
1. Ilie Ivanov - Classical physics - Theoretical bases and solved problems - university level - Printech Publishing House, Bucharest 2002.
2. C.N.Plavitu – Physics of thermal phenomena I, II, III, Hyperion XXI Publishing House, Bucharest 1994.
3.G.Moisil, Physics for engineers, vol.2, Editura Tehnica, 1967
4.A Hristev, Mecanica si acustica, Editura didactica si pedagogica –Bucuresti 1984.

* 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 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 and meets the requirements imposed on the labor market, being agreed by social partners, professional associations and employers in the field related to the bachelor's program. The content of the discipline can be found in the curriculum of the specialization INSTITUTION AND DATA ACQUISITION and in other university centers in Romania that have accredited this specialization, so knowing the basic notions is a stringent requirement of employers in the field. In order to better adapt the content of the discipline to the requirements of the labor market, meetings were held with both representatives of the business environment and teachers from pre-university education.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- correctness of knowledge - completeness of knowledge - use of specialized vocabulary	- written test for final assessment of knowledge (exam, in the exam session) -face to face or online	70%
10.5 Seminar	- degree of operation with acquired knowledge - learning to use the acquired knowledge to solve theoretical / applicative problems - use of specialized vocabulary - degree of accomplishment of work tasks (individual work, homework)	- evaluation along the way, following the activity during seminar hours (participation in discussions)	30%
10.6 Laborator			
10.7 Project			
10.8 Minimum performance standard: attendance at least 50% of the total number of hours of courses and seminars, minimum knowledge of the subject (course, seminar), minimum capacity for processing and transfer of information			
Grade components: Exam (Ex), Seminar (S), Laboratory (L), Project (P). - Calculation formula has notedi: N = xxxEx + xxxS + xxxL + xxxP; Condition for obtaining credits: N ≥ 5; S = ≥ 5; L = ≥ 5; P = ≥ 5.			

Completion date:

Date of endorsement in the Department of Electrical Engineering:

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 High education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Electrical Engineering
1.4 Study area	Electrical Engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	ELECTROMECHANICS / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**QUALITY AND RELIABILITY**						
2.2 Holder of the subject	Assoc. Prof. ȘOPRONI VASILE DARIE						
2.3 Holder of the academic seminar/laboratory/project	drd.ing. Adrian Szoke						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Vp.	2.7 Subject regime	Specialized Discipline (I)

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

3.1 No.of hours/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					**33**
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					**6**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**10**
Tutorials					**2**
Examinations					**3**
Other activities.					-
3.7 Total hours of individual study	**33**				
3.9 Total hours per semester	**75**				
3.10 Number of credits	**3**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Restraints) Electrotechnics, Electrical equipment, Electrical installations, Electrical technology
4.2 related to skills	Knowledge of symbols, specific graphics, electrical diagrams

5. Conditions (where applicable)

5.1. for the development of the course	-Video projector, computer. The course can be held face to face or online
5.2. for the development of the academic	- Equipment related to the conduct of seminar classes - Preparation of the paper, knowledge of the notions contained in the

seminary/laboratory/project	seminar paper to be performed (synthesis material); - Carrying out all seminar papers. The seminar can be held face-to-face or online.

6. Specific skills acquired	
Professional skills	▪ - C1. Proper implementation of specific fundamental knowledge of mathematics, physics, chemistry, in the field of electrical engineering ▪ - C2. Use of fundamental concepts of computer science and information technology ▪ - C3. Use of fundamental knowledge of electrotechnics ▪ - C4. Design of electrical systems and their components ▪ - C5. Design and coordination of experiments and tests ▪ - C6. Diagnosis, troubleshooting and maintenance of electrical systems and components
Crosscut skills	▪ CT1. Identification of the objectives to be achieved, available resources, conditions to complete them, working stages, working times, associated deadlines and risks ▪ - CT2. Identification of the roles and responsibilities in a multidisciplinary team and use of relationship and effective working techniques in the team ▪ - CT3. Effective use of information and communication sources and assisted professional training (Internet portals, specialized software applications, databases, online courses etc.) both in Romanian and in a 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 of Quality and Reliability is addressed to first year students, specialization, ES, and is designed to present modern interdisciplinary issues regarding reliability and diagnosis, quality of equipment and devices in the field of electrical engineering. Through the approached topic, the course is meant to allow students to acquire basic knowledge, in the first stage, will study reliability indicators of elements and systems on the main phenomena that occur in the operation of electrical appliances, and in the stage of second of some knowledge regarding the maintenance of electrical equipment. The course also aims to facilitate students' development of skills and competencies in the issue of correct choice of equipment that is part of electrical installations.
7.2 Specific objectives	▪ The seminar is designed to provide future engineers in the field of electrical engineering, practical skills in electrical maintenance, construction, research, operation, repair and maintenance of electrical, electromechanical, electrothermal installations. The content of the seminar presented is based on the need to deepen the problems presented in the course. ▪ The students have the opportunity to study the quality of electrical equipment and devices, identify, electrical supply diagrams of electrical equipment, familiarization with modern means of measuring temperature, electrical parameters during the operation of electrical equipment. They will be able to understand the complexity, usefulness and maintenance of these facilities and treat them as such. Knowledge is useful in the formation of skills to address the specific problems faced by a specialist in the field of electrical engineering.

8. Contents*

8.1 Course	Teaching methods	Nr. Hours/ Notes
1. History of the development of reliability, diagnoses and qualities, notions, composition and representations. High-performance systems. Efficient systems;	• Video projector; The courses are carried out by teaching the subjects and involving the students in dialogues. Then student contributions on course-specific topics are requested.	2
2. Reliability indicators of elements and systems. General reliability indicators of irreparable elements;	Idem (same)	2
3. Modeling the defects of the electrotechnical devices;	Idem	2
4. Structural redundancy of elements and systems. Modeling the failure of the elements. Modeling of wear processes. Modeling fatigue processes;	Idem	2
5. Indicators and methods for evaluating the reliability of electrical equipment. General aspects regarding the reliability of electrical equipment;	Idem	2
6. Systematic analysis of the forecast reliability of electrical equipment. Predictive reliability analysis of power transformers;	Idem	2
7. Estimation with confidence intervals. Accuracy estimation with confidence intervals. Design of reliability tests;	Idem	2
8. Case study on the operational reliability of electrical equipment Methodological considerations on the study of operational reliability. Global indicators of operational reliability of subsystems;	Idem	2
9. Behavior of systems with renewal in finite time intervals. Availability. Types of renewal;	Idem	2
10. Optimum problems in the field of electrical equipment maintenance. Optimization criteria for maintenance problems. Optimizing the allocation of human potential for the execution of maintenance works;	Idem	2
11. Reliability allocation engineering. Reliability prediction and allocation. Maintenance allocation prediction. Reliability testing;	Idem	2
12. Modern technologies for the maintenance of electrical equipment. Technical diagnosis of electrical equipment;	Idem	2
13. Global modeling of systems reliability through Markov processes. Markovian modeling of systems. Modeling Markov processes for the global description of a system without renewal. Modeling Markov processes for the global description of a system with renewal;	Idem	2
14. Structural modeling of systems reliability by Markov processes. Markov process model for a serial system. Markov process model for a parallel system.	Idem	2

Bibliography

[1]. Baron T.; ş.a.; Calitate şi fiabilitate. Manual practic. Vol I,II Editura Tehnică Bucureşti 1988.
[2]. Ciobanu L.; Tratat de inginerie electrică. Fiabilitate, Diagnoză şi elemente de calitate.Ed Bucureşti, Matrix Rom, 2008;

[3]. Felea I.; Secui C.; Dziţac S.; Îndrumător de aplicaţii în fiabilitate Ed. Universităţii din Oradea, 2008
[4]. Felea I.; Coroiu N.; Fiabilitatea şi mentenanţa echipamentelor electrice Ed. Tehnică Bucureşti 2001.
[5]. Panaite, V, Popescu M., Calitatea produselor şi fiabilitate, Bucureşti, Matrix Rom, 2003;
[6]. Sarchiz D.; Optimizarea fiabilităţii sistemelor electrice. Modele, Aplicaţii, Programe Ed Bucureşti, Matrix Rom, 2005
[7]. Staşac Claudia.; Fiabilitatea echipamentelor electrice – Note de curs- pentru uzul studenților.

8.2 **Seminar**	Teaching methods	No. hours / Notes
1. Labor protection standards specific to electrical equipment. Basic notions and concerns in reliability;	In the first hour of the seminar, the notions related to the labor protection specific to electrical equipment will be presented by the teacher coordinating the seminar papers;	2
2. Laws of distribution of random variables. Distribution functions and probability function. Characteristic sizes. Distributions of discrete and continuous random variables. Probabilistic functions in the reliability of the simple element;	- Test regarding the theoretical knowledge related to the seminar; - Carrying out experimental determinations; - Interpretation of the obtained results;	2
3. Evaluation of reliability indicators based on equivalent reliability diagrams Solving some proposed applications;	Idem	2
4. Determining the reliability indicators of systems with active reserve elements using Markov chains with continuous parameter;	Idem	4
5. Evaluation of the reliability indicators of the systems with elements in reserve applying the method of Markov chains with continuous parameter;	Idem	2
6. Testing of vibration electrical equipment;	Idem	4
7. Preventive and corrective maintenance of switching devices.	Idem	2
8. Vibration test of electrical contacts	Idem	2
9. Shock test of electrical equipment	Idem	2
10. Applications of reliability in technology	Idem	2
11. Teaching seminars and holding them;	Idem	2
8.3 Laboratory		

Bibliography

[1]. Baron T.; ş.a.; Calitate şi fiabilitate. Manual practic. Vol I,II Editura Tehnică Bucureşti 1988.
[2]. Ciobanu L.; Tratat de inginerie electrică. Fiabilitate, Diagnoză şi elemente de calitate.Ed Bucureşti, Matrix Rom, 2008;
[3]. Felea I.; Secui C.; Dziţac S.; Îndrumător de aplicaţii în fiabilitate Ed. Universităţii din Oradea, 2008
[4]. Felea I.; Coroiu N.; Fiabilitatea şi mentenanţa echipamentelor electrice Ed. Tehnică Bucureşti 2001.
[5]. Panaite, V, Popescu M., Calitatea produselor şi fiabilitate, Bucureşti, Matrix Rom, 2003;
[6]. Sarchiz D.; Optimizarea fiabilităţii sistemelor electrice. Modele, Aplicaţii, Programe Ed

București, Matrix Rom, 2005
[7]. Staşac Claudia.; Fiabilitatea echipamentelor electrice – Note de curs- pentru uzul studenților.

- Enlarge upon the content, mainly the number of hours allocated to each course/seminar/laboratory/project along the 14 weeks of each semester of the academic year.

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

- The content of the discipline is adapted and satisfies the requirements imposed by the labor market, being agreed by the social partners, professional associations and employers in the field related to the bachelor program. The content of the discipline is found in the curriculum of Electromechanics or Electrical Systems and other university centers in Romania that have accredited these specializations, so knowledge of the basics is a stringent requirement of employers in electromechanical, electrical, electronic such as: Faist, Comau , SC Stimin Industries S.A. Celestica, Connectronix, Plexus.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- For grade 5 all subjects must be treated to minimum standards; - For grades 10 all subjects must be treated to maximum standards;	Written or oral exam - duration 2 hours. Students have the opportunity to choose the assessment method (written or oral exam). The exam consists of 3 topics from the course topic. In order to pass the exam, each subject must be treated for at least grade 5. The evaluation can be done face to face or online.	60 %
10.5 Seminar	- In the last seminar session the students will present the works performed, respectively the results obtained;	- All the papers from the seminar must be performed, condition to enter the exam. - The share of the seminar is 40% of the value of the exam grade. - It is allowed to recover only one remaining seminar (in the last week of the semester).	40 %
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Carrying out work under the coordination of a teacher, to solve specific problems maintenance, maintenance and diagnosis of electrical equipment with the correct assessment of workload, available resources, time required to complete and risks, in conditions of application of safety rules and occupational health. Principle of operation and maintenance diagnosis, composition of electrical equipment.			
-Note components: Exam (Ex), Laboratory (LF) and Report / synthesis material (R);			

-Note calculation formula: N = 0.60Ex + 0.40LF;
- Condition for obtaining loans: N≥5; LF≥5; R ≥5.

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUȘ / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**STRENGTH OF MATERIALS AND MACHINE PARTS**				
2.2 Holder of the subject			Lecturer Phd.ing. Codreanu Octavian				
2.3 Holder of the academic seminar/laboratory/project			Lecturer Phd.ing. Codreanu Octavian				
2.4 Year of study	I	2.5 Semester	II	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 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	5
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	8
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	Classroom with video projector
5.2.for the development of the academic seminary/laboratory/project	Laboratory room

6. Specific skills acquired

Professional skills	C.3 Appropriate application of knowledge of energy conversion, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipment and electromechanical drives C3.2 Explain and interpret the operating regimes of static converters, electromechanical converters, electrical equipment and electromechanical drives C.6 Perform operation, maintenance, service, system integration activities C6.1 Define basic concepts of operation and maintenance of electromechanical systems C6.2Identify and select components for operation, maintenance and integration in electromechanical systems C6.3 Commissioning, in-service testing, fault analysis and troubleshooting of electromechanical systems
Transversal skills	- Perform professional tasks according to specified requirements and within deadlines, following a pre-established work plan and under qualified guidance. - Integrating easily into a group, taking on specific roles and communicating well as part of a team. - Achieving personal and professional development, making effective use of own resources and modern study tools

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 is to study the behaviour of resistance elements under the action of other bodies or forces and, on the basis of the conclusions of this study, to establish quantitative, mathematical relationships which ensure, under economic conditions, the strength, stiffness and stability of constructions or assemblies of machines. • also familiarises students with and develops skills for solving material strength problems. • basic acquisition necessary for the formation of technical culture, being the first course that is the basis of engineering training. • familiarizing students with the applications encountered in the practical work of the engineer.
7.2 Specific objectives	• training in the analysis and problem solving skills of strength of materials and machine parts • the methodology for solving the problems of dimensioning, verification, bearing capacity, elements and resistance organs

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
MATERIAL RESISTANCE ISSUES	Exposure items and examples of practical applications video projector, blackboard	2
EFFORT DIAGRAMS IN STRAIGHT BARS	Exposure items and examples of practical applications video projector, blackboard	4
TRACTION AND COMPRESSION	Exposure items and examples of practical applications video projector, blackboard	2
TORSION-TWISTING	Exposure items and examples of practical applications video projector, blackboard	2
STRESSES IN THE BARS STRESSED AT BENDING	Exposure items and examples of practical applications video projector, blackboard	3
DEFORMATION OF THE STRAIGHT BARS REQUIRED AT BENDER	Exposure items and examples of practical applications video projector, blackboard	2
BUCKLING OF THE STRAIGHT BARS	Exposure items and examples of practical applications video projector, blackboard	3
ORGAN FUNDAMENTALS OF MACHINES	Exposure items and examples of practical applications video projector, blackboard	4
NON-DEMOUNTABLE JOINTS AND ORGANS ASSEMBLIES	Exposure items and examples of practical applications video projector, blackboard	4
PARTS OF THE ROTARY MOVEMENT	Exposure items and examples of practical applications video projector, blackboard	2

Bibliography

1) Babeu, T., Resistance of Materials, vol. I, Technical University of Timisoara, Faculty of Mecanicã, 1991.
2) Buzdugan, Gh., Resistance of Materials, Ed. Academiei, Bucharest, 1986
3) Fazecas M., -Rezistenta si durata de viata a cuplajelor, Ed. Politehnica Tm., 2007.
4) Mocanu, D.,R., - Resistance of materials, Ed. Tehnicã, Bucharest, 1980.
5) Sofonea, G., Tiperciuc, Gh., - Resistance of materials, Ed. Institutului Politehnic ClujNapoca, Fac. de Mecanicã, Sibiu, 1988.
6) Tudose,I., Constantinescu,D., N., Stoica, M., - Resistența materiais Aplicații, Ed. tehnicã, București, 1990.
7) Tataru, B., Fazecas M., Resistenta materiais, Ed.Universitatii din Oradea, 2006.
8) Tarca Ioan, Organe de masini, University of Oradea, 2004.

8.2 Seminar	Teaching methods	No. of hours/ Observations
Calculation of reaction forces	Problem solving	2
Force diagrams in straight and curved bars and bar systems	Problem solving	5
Stretching and compression	Problem solving	2
Calculation of torsional strength	Problem solving	1
Calculation of bending deformations of straight bars	Problem solving	1
Calculation of joints	Problem solving	3

Bibliography

1. Buzdugan, Gh., et al, - Strength of Materials Applications, Ed. Academiei Române, Bucharest, 1991.
2. Roșca, G., Prichici,M., Tătaru,B., Hora,H., - Theory of elasticity and strength of materials, Indrumător for laboratory work, University of Oradea, 1994
3. Tudose,I., Constantinescu,D., N., Stoica, M., - Resistance of Materials Applications, Ed. tehnică, Bucharest, 1990

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

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 of material strength and machine parts is in accordance with those taught at other universities in the country/abroad.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Students are given two written subjects	The exam will be written and oral	70%
10.5 Seminar	Students receive a written problem		30%
10.6 Laboratory			
10.8 Minimum performance standard: $N=0,7\ N_C+0,3\ N_S$			

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	**Electrical Engineering and Information Technology**
1.3 Department	**Electrical Engineering**
1.4 Field of study	**Electrical Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study Programme/Qualification	**Electromechanics / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of discipline	**TECHNOLOGICAL METHODS AND PROCEDURES**						
2.2 Holder of course activities	**Chef.lucr.dr.ing. GAL TEOFIL**						
2.3 Holder of seminar /laboratory/project activities	**Chef.lucr.dr.ing. GAL TEOFIL**						
2.4 Year of study	I	2.5 Semester	1	2.6 Type of evaluation	Vp	2.7 Subject regime	DD

FD – Fundamental Discipline, DD – Domain Discipline, SD – Specialty Discipline, CD – Complementary Discipline

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 seminar/laboratory/project	1
3.4 Total hours in the curriculum	42	of which: 3.5 course	28	3.6 seminar/laboratory/project	14
Distribution of the time					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					10
Preparation of seminars/laboratories, themes, reports, portfolios and essays					7
Tutoring					3
Examination					3
Other activities.....					

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Technical drawing
4.2 related to skills	Knowledge of symbols, graphs, specific to electrical diagrams.

5. Conditions (where applicable)

5.1. for the development of the course	-Video projector, computer; - The course is conducted face to face; - Attendance at least 80% of courses.
5.2. for the development of the academic seminary/ laboratory/ project	- The laboratory is conducted face to face; - Equipment related to the laboratory hour; - Preparation of the report (synthesis material); - Performing all laboratory work; - A maximum of one laboratory work can be recovered; - Frequency in laboratory classes: less than 70% leads to the restoration of discipline.

6. Specific competencies acquired

Professional skills	**C4. Use of electrical and non-electrical quantity measurement techniques and data acquisition systems in electromechanical systems** **C4.1.** Adequate description of basic concepts and principles of measurement techniques and acquisition of data specific to electrical engineering. **C5. Automation of electromechanical processes** **C5.4.** Choosing the optimal solution for automatic adjustment of technological parameters (speed, position, torque, temperature, flow, level, pressure, etc.), to ensure the achievement of the required quality objectives. **C6. Carrying out operation, maintenance, service, system integration activities** **C6.1.** Defining basic concepts regarding the operation and maintenance of electromechanical systems.

Crosscutting skills	

7. Objectives of the discipline (resulting from the grid of specific competencies accumulated)

7.1 General objective of the discipline	– Acquisition by students of concepts related to technological methods and procedures, methods of analysis and synthesis of their structure; Applying general technical and specialized knowledge to solve logistic problems specific to the field of electrical engineering.
7.2 Specific objectives	Development and use of schemes, structural and functioning diagrams, graphic representations and technical documents specific to the field of electrical engineering.

8. Contents*

8.1 Course	Teaching methods	No. Hours / Observations
1. Basic knowledge of technological methods and processes 1.1. Production process 1.2. Technological process	Video projector exposure. In case of online deployment, the e-learning platform of the University of Oradea (https://e.uoradea.ro) will be used, and in the "video – audio conference" mode, the Microsoft Teams or Zoom communication platform will be used. The courses are conducted by teaching topics and engaging students in discussions on the course topic. Interspersed are student contributions on course-specific topics.	2 hours
1.3. Technological flow 1.4. Technical quality control 1.5. Choosing the optimal variant of the technological process 1.6. Elements of technical norming in the technological process	Idem	2 hours
1.7. Machining accuracy of parts and products. Tolerances and adjustments 1.8. Dimensions, deviations and tolerances 1.8.1. Games, tightenings and adjustments 1.8.2. Dimensional chains 1.8.3. System of tolerances and adjustments	Idem	2 hours
2. Material properties 2.1. Material properties and tests 2.2. Physical properties 2.3. Electrical properties 2.4. Magnetic properties 2.5. Mechanical properties and tests	Idem	2 hours
2.6. Chemical properties 2.7. Electrical properties of insulating materials 2.8. Physico-chemical properties of insulating materials 2.9. Properties of aluminium 2.10. Properties of copper	Idem	2 hours
3. Materials used in industry 3.1. Materials used in machine building 3.2. Metals and alloys used in electrical engineering 3.3. Electrical insulation materials used in electrical engineering 3.3.1. Gaseous electrical insulation materials 3.3.2. Liquid electrical insulation materials	Idem	2 hours
3.3.3. Organic solid electrical insulation materials 3.3.4. Electro-Electroizolating Material for Anorganic Solids	Idem	2 hours
4. Technological methods and procedures of cold mechanical processing 4.1. Cutting methods and processes 4.1.1. Turning 4.1.2. Milling 4.1.3. Drilling	Idem	2 hours
4.1.4. Rabubling 4.1.5.Polishing 4.1.6.Corrigendum	Idem	2 hours

4.1.7. Other processing processes 4.2. Methods and procedures for processing materials by cold plastic cutting and deformation 4.2.1. Cutting 4.2.2. Stamping 4.2.3. Continuous deformation		
4.2.4. Bending 4.2.5. Drawing 4.2.6. Special sheet metal processing processes 4.3. Unconventional technologies 4.3.1. Electro-erosion processing	Idem	2 hours
5. Innovative technologies in material processing 5.1. Plasma cutting technology 5.2. Friction welding with rotating active element 5.3. 2D and 3D Laser Welding 5.4. Non-destructive material processing processes 5.5. Shock laser processing 5.6. Innovative press processing process 5.7. Ingot heating process using superconducting magnets	Idem	2 hours
5.8. Nanotechnology 5.9. Waterjet cutting 5.10. Hyperbaric pipe welding technology 5.11. Bio Nanotechnology 5.12. Technology of material processing by solidification with phase change surface control 5.13. Graphene	Idem	2 hours
6. Corrosion and corrosion protection of metals and alloys 6.1 Corrosion of metals 6.1.2. Chemical corrosion 6.1.3. Electrochemical corrosion	Idem	2 hours
6.2. Anticorrosive protection of metals and alloys	Idem	2 hours

Bibliography:

1. **Livia Bandici** - "*Technological methods and procedures*" – Online course platform https://e.uoradea.ro/course/view.php?id=20565
2. St. Nagy, **Livia Bandici** - "**Technological methods and procedures***", University of Oradea Publishing House, 2017, ISBN 978-606-10-1888-8.*
3. V. Petre - "*Electromechanical Technology – Laboratory Guide*", UPB, 2001.
4. F. Anghel, M.O. Popescu - "*Electromechanical Technologies*", UPB, 2001.
5. F. Anghel, I. Bestea - "*Electromechanical Technologies – Practical Applications*", UPB, 2003.
6. T. Tudorache – "Technological methods and procedures", UPB, 2003.
7. L. Balteș – "Science and Engineering of Materials", Reprography of "Transilvania" University of Braşov, 2004.
8. G. Oprea – "*Physical chemistry. Theory and Applications",* Risoprint Publishing House, Cluj Napoca, 2005, ISBN 973-656-909-8.
9. D. Hoble, Livia Bandici, Șt. Nagy - "High-performance systems for electrothermal processing of materials*", University of Oradea Publishing House, 2012, (ISBN 978-606-10-0767-7).*
10. **Livia Bandici**, D. Hoble, Șt. Nagy – "*Innovative technologies in materials processing*", University of Oradea Publishing House, 2011, (ISBN 978-606-10-0472-0).

8.2 Seminar	Teaching methods	No. Hours / Comments
---	---	---
8.3 Laboratory		
1. Presentation of papers, training on technical norms of occupational safety, processing of experimental data	- Presentation of the report (synthesis material); - Testing theoretical knowledge related to the laboratory; - Interpretation of the obtained results.	2 hours
2. Standardization in the machine building industry and electrical engineering	Idem	2 hours
3. Metals and alloys used in the electrical industry. Experimental determinations using resistor furnace for melting	Idem	2 hours
4. Technological processes of cold processing	Idem	2 hours
5 Hot processing processes	Idem	2 hours
6. Using the MACH4 program	Idem	2 hours
7. Conclusion of the situation at the laboratory. Recovery of a laboratory work.	- Teaching laboratories by supporting them; - Only one outstanding laboratory work is allowed to be recovered.	2 hours
Bibliography		

1) **Livia Bandici,** Stefan Nagy - *Technological methods and procedures. Practical laboratory work*. University of Oradea Publishing House, 2018, ISBN 978-606-10-1958-8.
2) V. Petre - "*Electromechanical Technology – Laboratory Guide*", UPB, 2001.
3) F. Anghel, M.O. Popescu - "*Electromechanical Technologies*", UPB, 2001.
4) F. Anghel, I. Bestea - "*Electromechanical Technologies – Practical Applications*", UPB, 2003.
5) T. Tudorache – "*Technological methods and procedures",* UPB, 2003.
6) L. Balteş – "*Science and Engineering of Materials*", Reprography of "Transilvania" University of Braşov, 2004.
7). G. Oprea – "*Physical chemistry. Theory and Applications",* Risoprint Publishing House, Cluj Napoca, 2005, ISBN 973-656-909-8.
8). St. Nagy, **Livia Bandici** - "*Technological methods and procedures*". University of Oradea Publishing House, ISBN 978-606-10-1888-8, 2017.
9). Hütte – "*The Engineer's Handbook. Fundamentals*", Editura Tehnica, Bucharest, 1989.

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

- The content of the discipline is adapted and meets the requirements imposed by the labor market, being agreed by social partners, professional associations and employers in the field related to the bachelor program *Electromechanics.*

10. Rating

Task Type	10.1 Assessment criteria	10.2 Methods of evaluation	10.3 Weight of the final note
10.4 Course	Periodic check (duration 2 hours): - For grade 5: all subjects must be treated to minimum standards; - For grades >5 all subjects must be treated to maximum standards;	- The evaluation is face-to-face. - Week 7: IPV accounts for 50% of 0.5 VPF; Week 14: IPV accounts for 100% of VPF or 50% of VPF (for those with IPV).	- 50 % of 0,5 VPF; - 100% of 0.5 VPF or 50% of VPF (for those with IPV).
10.5 Laboratory	- For grade 5: all tests and final test must be treated to minimum standards; - For grades >5 all tests and final test must be treated to maximum standards.	- All laboratory work must be performed (condition of participation in VP); - The weight of the laboratory is 50% of the NVP value (for each stage); - Recovery of an outstanding laboratory work is allowed.	Lab note. =50% of PV value for each step.
Note components: Final Periodic Review (VPF), Laboratory (LF) and Report/synthesis material (R); -Calculation formula has notedi: Note VP=0.5VPF+0.5LF; LF=0.450L +0.05R; VPF=(IPV+IIPV)/2; - Condition for obtaining credits: N≥5; LF≥5.			
10.6 Minimum Performance Standard: Carrying out works under coordination, in order to solve specific problems in the field, with the correct assessment of the workload, available resources, necessary completion time and risks, under the conditions of application of occupational safety and health rules; Adequate use of fundamental knowledge of technological methods and processes used in the machine building and electrical industries.			

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics BEIUS / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**DESIGN OF ELECTRICAL SYSTEMS**			
2.2 Holder of the subject				Popa Monica			
2.3 Holder of the academic seminar/laboratory/project				Popa Monica			
2.4 Year of study	IV	2.5 Semester	VII	2.6 Type of the evaluation	Ex	2.7 Subject regime	O

(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 academic project	1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 academic project	14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	2
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	2
Tutorials	1
Examinations	1
Other activities.	

3.7 Total of hours for individual study	**8**
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	Electrical installations, Electrical equipments
4.2 related to skills	Computer operation

5. Conditions (where applicable)

5.1. for the development of the course	on-site
5.2. for the development of the academic project	on-site Computers and software packages for design of electrical installations

6. Specific skills acquired	
Professional skills	**C4** Design of electrical systems and their components **C4.3** Applying of design methods in representative electrical systems **C6** Diagnosis, troubleshooting and maintenance of electrical systems and components **C6.4** Evaluation el electical systems quality **C6.5** Elaboration and testing of an analysis program for a specific electrical systems

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

7.1 The general objective of the subject	▪ Design of electrical installations
7.2 Specific objectives	▪ Explanation and interpretation of software packages for design and optimization of representatives electrical sysstems ▪ Interpretation of results obtained with CAD software packages

8. Contents *

8.1 Course	Teaching methods	No. of hours/ Observations
Design stages. The architecture of low voltage systems.	notes on blackboard, Power Point presentation	2
Computation methods in low voltage electrical installation	notes on blackboard, Power Point presentation	2
CAD of lighting systems. DIALux software	notes on blackboard, Power Point presentation	2
CAD of low voltage installations. Ecodial software	notes on blackboard, Power Point presentation	2
Ladder language	notes on blackboard, Power Point presentation	2
Ladder programming	notes on blackboard, Power Point presentation	2
Implementation of intelligent relays	notes on blackboard, Power Point presentation	2
Computation of shortcircuit currents	notes on blackboard, Power Point	2

	presentation	
Exemplification of shortcircuit currents.	notes on blackboard, Power Point presentation	2
The overcurrent protection Thermal and electrodinamic stability.	notes on blackboard, Power Point presentation	2
CAD for conductors dimensioning Third harmonic	notes on blackboard, Power Point presentation	2
Comutation equipments – protection characteristics, Protection selectivity.	notes on blackboard, Power Point presentation	2
Electrical shock protection – computation methods in TT, TN, IT earthing systems	notes on blackboard, Power Point presentation	2
Electrical efficiency in low voltage distribution systems	notes on blackboard, Power Point presentation	2

Bibliography

1. Monica Popa – Note proiect, **http://webhost.uoradea.ro/mpopa/**
2. Colectii de STAS si Normative – SR EN 60364, NP/I7/2011 …
3. Ismail Kasicki – Short Circuit in Power Systems , Wiley – VCH Verlag GmbH, Weinheim, Germany 2002
4. Ghidul pentru instalatii electrice 2018 – editat de Schneider Electric
5. ECODIAL User's Manual
6. DIALUX User's Manual
7. CADDY ELECTRICAL User's Manual
8. Diagrame Ladder – Documentatie firme producatoare AP
9. I7-2011

8.2 Project	Teaching methods	No. of hours/ Observations
Project tasks. Elaboration steps	assisting the students in solving pplications on computer	2
Establishing of distribution network. The layout of electrical installation	assisting the students in solving pplications on computer	2
Interior lighting design – DIALux	assisting the students in solving pplications on computer	2
Low voltage installation design - Ecodial software	assisting the students in solving pplications on computer	2
Interpreting results in Ecodial.	assisting the students in solving pplications on computer	2
Intelligent relays. Ladder diagram	assisting the students in solving pplications on computer	2
Simulation of operation	assisting the students in solving pplications on computer	2

Bibliography

1. Ghidul pentru instalatii electrice 2018 – editat de Schneider Electric

2. ECODIAL User's Manual
3. DIALUX User's Manual
4. CADDY ELECTRICAL User's Manual

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

- The content of the 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	Ability to solve a CAD application	Oral examination, Application on computer	60%
10.5 Project	Solving the project tasks	Testing the project. Results inerpretation	40%
10.6 Minimum performance standard:			
Passing the subject - grade ≥ 5.			

Completion date: 28.08.2023

Signature of subject holder
Assoc. Prof. Monica Popa
E-mail: mpopa@uoradea.ro

Signature of academic laboratory holder
Assoc. Prof. Monica Popa

Date of endorsement in the department: 29.08.2023

Signature of Department Head
Lecturer. Mircea Nicolae Arion
E-mail: mnarion@gmail.com

Date of endorsement in the Faculty Board: 29.09.2023

Signature of Dean
Prof. 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 ELECTRICAL ENGINEERING
1.4 Field of study	ELECTRICAL ENGINEERING
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics Beiuş Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**ELECTROTHERMICS**					
2.2 Holder of the subject		**Conf.dr.ing. BANDICI LIVIA**					
2.3 Holder of the academic seminar / laboratory / project		**Conf.dr.ing. BANDICI LIVIA – Laboratory**					
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	Ex	2.7 Subject regime	DS

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

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic 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					5
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					-
Tutorials					1
Examinations					3
Other activities.					-

3.7 Total of hours for individual study	**14**
3.9 Total of hours per semester	**56**
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 development of the course	- Video projector, computer; - The course can be held face to face or online; - Attendance: at least 50% of the courses.
5.2.for the development of the academic seminary/laboratory/project	- The laboratory can be held face to face or online; - The equipment related to the laboratory class; - Preparation of the report (synthesis material);

	- Carrying out all laboratory works; - The recovery of one missed laboratory is allowed; - Attendance at laboratory classes: less than 70% leads to the restoration of the discipline.
6. Specific skills acquired	
Professional skills	**C.3. Appropriate application of energy conversion knowledge, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipments and electromechanical drives**

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 "Electrothermics" aims to familiarize students with the study and utility of electrothermal equipment. Being a specialized discipline, its object is to present in a uniform framework the electrothermal equipment for the conversion of electric energy into heat, especially those specific to the industrial field. Students have the opportunity to familiarize themselves with various electrothermal installations, to acquire practical skills regarding the building, sizing and operating of electrothermal installations, with the possibility to execute, maintain, exploit and repair them.
7.2 Specific objectives	The laboratory is designed to provide future electromechanical engineers with practical skills in designing, building, researching, operating, repairing and maintaining electrothermal installations. The contents of the presented laboratory works are based on the need to deepen the problems presented in the course. Students have the possibility of identifying electrical circuits for electrothermal installations, to familiarize themselves with modern means of temperature measurement, of electrical parameters during electrothermal processes. They will understand the complexity and usefulness of these facilities and treat them as such. Knowledge is useful in forming skills to address specific issues faced by a specialist in the field of electromechanics.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
I. General problems with electrothermal installations	Projector. Intercalated student contributions are requested on subject-specific topics. Platforma e-learning a University of Oradea (https://e.uoradea.ro). Some courses take place by teaching subjects and student debates.	2
II. Materials used in the construction of electrothermal equipment 2.1. Refractory materials 2.2. Heat insulating materials 2.3. Resistive materials 2.4. Materials for electrodes of electric arc furnaces **III. Heat transfer in electrothermal equipment** 3.1. Thermal conduction. 3.2. Thermal convection. 3.3. Thermal radiation. 3.4. Means for measuring temperature	Idem	2
IV. Electrical heating heaters 4.1. Classification of heating systems with electrical resistance 4.2. Heaters	Idem	2

4.3. Main features of electrical resistance heating systems 4.3.1. Constitutive elements 4.4.1. Discontinuous direct-heating systems. 4.4.2. Continuous direct-heating systems		
4.4.3. Direct heating ovens 4.4.3.1. Furnaces for grafting and for production of carborundum 4.4.3.2. Glass melting furnaces 4.4.3.3. Furnaces for the extraction and refining of aluminum 4.4.3.4. Installations for direct water heating	Idem	2
4.5. Installations with electrical resistance with indirect heating 4.6. Laboratory electric furnaces	Idem	2
4.7. Home appliances 4.8. Infrared heating	Idem	2
V. Electric arc furnaces 5.1. Classification and areas of use 5.2. The electric arc 5.3. Electric arc furnaces with direct action for steel melting	Idem	2
5.4. Electric arc furnaces power at continuous voltage 5.5. Electric arc and resistance furnaces. 5.6. Vacuum melting electric arc furnaces 5.7. Flow layer melting furnaces 5.8. Plasma heating installations	Idem	2
VI. Electromagnetic induction heating 6.1. The principle of heating by electromagnetic induction 6.2. The penetration of the electromagnetic field and the power transmitted to the piece. The influence of material characteristics on penetration depth	Idem	2
6.3. Electrical parameters of the inductor-body system 6.4. Energy indicators of electromagnetic induction heating 6.5. Electrical equipment for electromagnetic induction heating	Idem	2
6.6. Applications of electromagnetic induction heating 6.6.1. Melting pot induction furnaces for metals 6.6.2. Channel induction furnace for melting metals	Idem	2
6.6.3. Deep heating by electromagnetic induction 6.6.4. Cross-flow heating 6.6.5. Surfacing 6.6.6. Special applications of induction heating	Idem	2
VII. Heating of dielectric materials 7.1. General notions on dielectric heating	Idem	2
7.2. Capacitive heating	Idem	2

Bibliography

[1]. Livia Bandici. *Electrotermie. Teorie şi aplicaţii.* Editura Universităţii din Oradea, 2016.
[2]. Livia Bandici, *Electrotermie*. Editura Universităţii din Oradea, 2004.
[3]. Livia Bandici, D. Hoble. *Electrotermie. Îndrumător de laborator*. Editura Universităţii din Oradea, 2000.
[4]. Livia Bandici, *Electrotermie – Aplicaţii*. Editura Universităţii din Oradea, 2003.
[5]. D. Comşa, *Instalaţii electrotermice industriale*. Editura Tehnică Bucureşti, 1986.
[6]. N. Golovanov, I. Șora, ș.a. – *Electrotermie şi Electrotehnologii*. Vol. I. Editura Tehnică, Bucureşti, 1997
[7]. A.E. Sluhoţki, S.E. Râşkin – *Inductoare pentru încălzirea electrică*. Editura Tehnică Bucureşti, 1983.
[8]. V. Firețeanu, *Electrotermie*. Culegere de aplicaţii. Editura Politehnică Bucureşti, 1991
[9]. V. Firețeanu, *Procesarea electromagnetică a materialelor*. Editura Politehnică Bucureşti, 1995.
[10]. Șora, V.Conta, D.Popovici, *Utilizări ale energiei electrice*. Editura Facla, 1983.
[11]. M. Ungureanu, M. Chindriş, I. Lungu, *Utilizări ale energiei electrice.* Editura Didactică şi Pedagogică Bucureşti, 1999.

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Work safety standards specific to electrothermal installations. Transmission of heat. Theoretical Applications.	In the first hour of the laboratory, the coordinating teacher will present the laboratory works, the notions related to work	2

	safety, specific to electrothermal installations. In the second part of the laboratory, a theoretical application on the transmission of heat will be made.	
2. Means of temperature measurement. Experimental determinations. Study of the instantaneous water heating system. Experimental determinations.	Presentation of the written report (synthesis material) by the students; Test on the theoretical knowledge aquired during the laboratory. Interpretation of the results.	2
3. Study on the resistor furnace with indirect heating used for heat treatments. Experimental determinations.	Idem	2
4. Study on the infrared heating installation. Experimental determinations.	Idem	2
5. Study on the channel induction furnace. Experimental determinations.	Idem	2
6. Study on the induction heating installation for surface hardening of metals. Experimental determinations.	Idem	2
7. Assessment of the knowledge acquired during the laboratory classes.	- presenting and handing out the laboratory papers; - the recovery of one missed laboratory is allowed.	2

Bibliography

[1]. Livia Bandici, D. Hoble. *Electrotermie. Studii teoretice şi aplicative.* Editura Universităţii din Oradea, 2009.
[2]. Livia Bandici, *Electrotermie*. Editura Universităţii din Oradea, 2004.
[3]. Livia Bandici, D. Hoble. *Electrotermie. Îndrumător de laborator*. Editura Universităţii din Oradea, 2000.
[4]. Livia Bandici, *Electrotermie – Aplicaţii*. Editura Universităţii din Oradea, 2003.
[5]. D. Comşa, *Instalaţii electrotermice industriale*. Editura Tehnică Bucureşti, 1986.
[6]. N. Golovanov, I. Şora, ş.a. – *Electrotermie şi Electrotehnologii*. Vol. I. Editura Tehnică, Bucureşti, 1997.

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	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For grades> 5 all subjects must be treated to maximum standards		

10.5 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard		
10.6 Minimum performance standard: Design of components of a low complexity electrical system. Solving problems specific to electrothermal installations, with the correct evaluation of the workload, of the available resources, of the necessary completion time and of the risks, in conditions of application of the norms of safety and health at work. Principle of operation and composition of electrothermal installations.			

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 ELECTRICAL ENGINEERING
1.4 Field of study	ELECTRICAL ENGINEERING
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics Beiuş Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**ELECTROTHERMICS**			
2.2 Holder of the subject				**Conf.dr.ing. BANDICI LIVIA**			
2.3 Holder of the academic seminar / laboratory / project				**Conf.dr.ing. BANDICI LIVIA – Project**			
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	Cv	2.7 Subject regime	DS

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	14	3.6 academic seminar/laboratory/project	14

Distribution of time	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	**5**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**-**
Tutorials	**1**
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	Electrical engineering, Electrical engineering, Electrical installations
4.2 related to skills	Knowledge of symbols, specific graphics, electrical diagrams.

5. Conditions (where applicable)

5.1. for the development of the course	-Video projector, computer; - The project can be carried out face to face or online.
5.2.for the development of the academic seminary/laboratory/project	- Equipment related to the development of project hours - calculation technique; - Preparation of the theoretical report related to the project theme; - The project can be carried out face to face or online.

6. Specific skills acquired	
Professional skills	**C.3. Appropriate application of energy conversion knowledge, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipments and electromechanical drives**

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 "Electrothermics" aims to familiarize students with the study and utility of electrothermal equipment. Being a specialized discipline, its object is to present in a uniform framework the electrothermal equipment for the conversion of electric energy into heat, especially those specific to the industrial field. Students have the opportunity to familiarize themselves with various electrothermal installations, to acquire practical skills regarding the building, sizing and operating of electrothermal installations, with the possibility to execute, maintain, exploit and repair them.
7.2 Specific objectives	The suggested themes are designed to provide future engineers with practical skills in designing, building, researching, operating, repairing and maintaining electrothermal installations. Knowledge is useful in forming skills to address specific issues faced by a specialist in electrical engineering.

8. Contents*

8.1 Project	Teaching methods	No. of hours/ Observations
Suggested themes: 1. The calculation of the parameters of an electric furnace with indirect heating resistors. 2. The calculation of the parameters of an infrared heating installation for heating a vat. 3. Designing an inductor for the electromagnetic induction heating of a cylindrical vat. 4. The calculation of the parameters of an inductor using two frequencies for heating steel bars. 5. The calculation of the parameters of an electromagnetic induction melting furnace. 6. The calculation of the parameters of an installation for gluing wood rods by radio frequency heating. 7. The calculation of the parameters of an inductor for heating a cylindrical vat.	Choice of theme. Discussions on how to elaborate the project.	2
I. General notions on the heating process II. Materials used in the construction of the installation	A brief approach to the main issues related to the design and choice of materials used in the construction of the installation.	2
III. The theoretical foundations of the calculation of the equipment	Explanations on how to calculate the main electrical quantities and methods of determination.	2
IV. The calculation of the parameters of the electrothermal equipment 4.1. The electrical parameters of the system 4.2. Determination of the thermal parameters	In the first part of the meeting, a review of the theoretical part presented by the students will be made. In the second part, a	2

	presentation of the concepts related to the calculation of the electrical and thermal parameters will be made.	
4.4. Determination of the equivalent parameters of the heating assembly and energy indicators 4.5. Determination of the capacitor battery to compensate for the power factor of the installation	In the first part of the meeting, a review of the calculations presented by the students until this stage will be carried out. In the second part, a presentation of how to calculate the equivalent parameters and the energy indicators of the heating equipment is made.	2
4.6. Determination of heating efficiency 4.7. The equivalent electrical scheme of the whole assembly. Conclusions	During the first part of the meeting, a review of the calculations presented by the students will be made. In the second part, a presentation of how to calculate the efficiency of the processing, respectively the mode of drawing the equivalent electric scheme will be made.	2
Final project evaluation	Defence and handing out of the elaborated project.	2

Bibliography

[1]. Livia Bandici, *Electrotermie. Aplicaţii*. (Îndrumător de proiectare). Editura Universităţii din Oradea, 2003.
[2]. Livia Bandici, *Electrotermie. Teorie şi aplicaţii*. Editura Universităţii din Oradea, 2016.
[3]. Livia Bandici, D. Hoble, *Electrotermie. Studii teoretice şi aplicative.* Editura Universităţii din Oradea, 2009.
[4]. Livia Bandici, *Electrotermie*. Editura Universităţii din Oradea, 2004.
[5]. D. Comşa, *Instalaţii electrotermice industriale*. Editura Tehnică Bucureşti, 1986.
[6]. N. Golovanov, I. Şora, ş.a., *Electrotermie şi Electrotehnologii*. Vol. I. Editura Tehnică, Bucureşti, 1997.
[7]. V. Fireţeanu, *Electrotermie*. Culegere de aplicaţii. Editura Politehnică Bucureşti, 1991.
[8]. V. Fireţeanu, *Procesarea electromagnetică a materialelor*. Editura Politehnică Bucureşti, 1995.
[9]. T. Leuca, *Câmpul electromagnetic şi termic cuplat – Curenţi turbionari*. Editura Mediamira Cluj-Napoca, 1996.
[10]. A.E. Sluhoţki, S.E. Râşkin, *Inductoare pentru încălzirea electrică*. Editura Tehnică Bucureşti, 1983.

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 project themes is adapted and satisfies the requirements imposed by the labor market, being agreed by the social partners, professional associations and employers in the field related to the bachelor program.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.1 Project	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	The evaluation can be done face to face or online.	Distinct grade from the one obtained at the exam.
10.2 Minimum performance standard: Design of components of a low complexity electrical system. Students have the opportunity to solve problems specific to electrothermal installations, the correct evaluation of the workload, of the available resources, of the necessary time.			

Completion date:
28.08.2023

Date of endorsement in the department:
29.08.2023

Date of endorsement in the Faculty Board:

29.09.2023

DISCIPLINE SHEET

1. Facts about the program

1.1 Highereducation institution	**UNIVERSITY OF ORADEA**
1.2 Faculty / Department	**ELECTRICAL** ENGINEERING **ANDINFORMATION** TECHNOLOGY
1.3 Chair	**ELECTRICAL ENGINEERING**
1.4 Field of study	**ELECTRICAL ENGINEERING**
1.5 Cycle of studies	**LICENȚĂ**
1.6 Study program/qualification	**ELECTROMECHANICAL BEIUȘ**

2. Discipline data

2.1 Name of the discipline			**ELECTROMECHANICAL SYSTEMS I**				
2.2 The holder of the course activities			**Șef lucrări.dr.ing. Gal Teofil Ovidiu**				
2.3 Holder of laboratory/project activities			**Șef lucrări.dr.ing. Gal Teofil Ovidiu**				
2.4 Year of study	**IV**	2.5 Semester	**7**	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 Număr de ore pe s ă pt ă ă r o ă ăă	**42**	of which: 3.2 course	**2**	3.3 laboratory/project	**1**
3.4 Total hours ofthe learning plan	**42**	of which: 3.5 course	**28**	3.6 laboratory/project	**14**
Distribution ofthetime fund for hours					**62**
Studyby textbook, course support, bibliography andnotes					**20**
Additional documentation inthe library, on specialized electronic platforms andin the field					**10**
Preparation of seminars/laboratories, themes, papers, portfolios and essays					**20**
Tutoriat					**6**
Examinecountries					**6**
Other activitiesi.....					

3.7 Total individual study hours	**62**
3.9 Total hours per semester	**104**
3.10 The numberof creditis	**4**

4. Preconditions (where applicable)

4.1 curriculum	Technical drawing
4.2 of competiționțe	Knowledge of symbols, graphs specific to electrical diagrams

5.Conditions (where applicable)

5.1. course development	- "The course can be held face to face or online" - Attendance at least 50% of the courses - Video projector , computer .
5.2. of laboratory /project development	- "The seminar/laboratory/project can be held face-to-face or online" - Equipment related to the laboratory class. ; - Preparation of the report (synthesis material); - Performing all laboratory hours; - A maximum of 2 papers can be recovered during the semester (30%); - The frequency at laboratory classes below 70% leads to the restoration of the discipline.

6. Specific competences acquired	
Professional skills	**C3.** Adequate application of knowledge on energy conversion, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipment and electromechanical drives **C3.4.** Assessment of the quality and functional performances of electromechanical systems by specific methods **C4.** The use of techniques for measuring electrical and non-electrical sizes, of data acquisition systems in electromechanical systems. **C5. 4.** T h eC o you are t c on t r o ls y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y a parametra t i on o f the hnologici, (vitesa, pozic a t i on, cupl t h eC o you are t c on t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s th eC o you are t c on tr o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t ctivelor de cal itate mpus
Cross-sectional	

7. Objectives of the discipline (based on the grid of specific competences accumulated)

7.1 The general objective of the discipline	The course "Electromechanical systems I " aims at definire a n i n t i on o f the th eC o you aret c on t r o l s y s temsa n d c o n t r o l s y s t e m s a n d c o n t r o ls y s t e m s t h eCo you are t c on t r o l s y s t e m s a n d compoen t s a n d c o n t r o l s y s t e m s an d c o n t r o l s y s t e m s i ms it iono f the
7.2 Specific objectives	- s i mplementer si on s is a tesstece sisteme m sa t i on o f the ru SEM - i'mplem e nte ze echip ame nt e l e l ectri ce, h i draii ic e s a p newasmeasuredc e p e e s truc t un u of SEM; -to measure the electrical / hydraulic / pneumatic paramenters of the SEM and to interpreteze datel e le o you arenotcon t; - w h ic h w h i c re la t i on s EM.

8. Conţinuturi

8.1.Curs	Teaching methods	Observaţii
CHAP.1. Cthe main construction of different types of SEM.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.2. Electromechanical systems – sources and receptors for electromagnetic disturbances	Free exposure, with the presentation of	2 hours

	the course on the video projector and on the blackboard	
CAP.3. Structure of electromechanical systems. Sources and receptors of disturbances	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.4. Block of work of SEM tipice: vehicul u s a n ergies t heC o you are tc on t r ols y s t em s a n d c o n t rols y s t e ms , t h eC o youaret c on t rol s y s t e m s a n d c o n t r o l s y s t e m s	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.5. The cinematic pad of SE M t ipice: s ii e con ve r ergiei b aza e e s e r e gene ra bi e, mi c rosisele c tramwalka nice, echip ame nt hee c troc asnc	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.6. Transmission system of the SEM tipice: microsisteme m ele c tromecanice used in e chipamentul electroc a snic a t i on s	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.7. The adjustment, command and control block of SEM: microsisteme m ele c tromecanice used to ech ipamentul electroc a snic.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.8. Types of disturbances occurring in SEM.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.9. Harmonics and voltage fluctuations in SEM.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.10. Classification and negative effects of harmonics in SEM.	Free exposure, with the presentation of the course on the	2 hours

	video projector and on the blackboard	
CAP.11. Mechanism of occurrence of disturbance in SEM.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours
CAP.12. Antiparasitic methods in SEM.	Free exposure, with the presentation of the course on the video projector and on the blackboard.	2 hours
Head. 13. Software used in SEM design.	Free exposure, with the presentation of the course on the video projector and on the blackboard.	2 hours
Head. 14. Diagnoz a t i on SEM: gener a lic a ti on o f the diagnosis of echip a m a m a m o n t r ie s, mon i t ori e s t a t i on o f the d is tan d i s t a n d i t you are e m	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours

Bibliography:

1. **M. Horgoş,** Masini si utilaje electromecanice, Editur a Risoprint Cluj Napoca, 2007.
2. **C l'awedia Marti,** T'sta r'e a and i proiecta r ea s i'sfearelor e thec t rome ca nce, Atelie rl e l e liplicare a l in i tuu u i Politehnic clu j-N a poca, 1987
3. M**ihai Gafi t and, Spiridon Cret, Barbu Dar** b u d a **n,** Dia g i ag t heC o you are t c on t r o l s y s t e m s a n d c o n t r o l s y s t e m s elor, Edi t you are a t e r a ti on o f the Bucyou areesti on, 1989
4. **N. U-Ficcher,** Vibrati i e s e i e ll or meca nice. It'sarandit's a pl'i e i, ed'ti aura Ca s a candr and d'e tit ie t a. , 1998.

8.2. Laboratory	Teaching methods	Observaţii
1. Th eC o you are t c on t r o ls y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e ms nci a t i on, organizara t i on o f the acti v i t i on o f the acti v i a t i on o f the activi t i on o f the borator o f the	Modelarea Case study	2h
2. Analiz a func ion c on c on a SEM.	Modelarea Case study	2h
3. Analiza comporti on o f efect a t i on o f the	Modelarea Case study	2h
4. Monitori es a pl ic a ti on o f the	Modelarea Case study	2h
5. Rezolv a r e a ti onof the problem arising in the operation of a	Modelarea	2h

SEM.	Case study	
6. T heCo you are t c on t r o l s y s t e m s a n d t h a t t h eC o you are t c on t r o l s y s t e m s a n d t h a t t h er e s u l t so f t h e a m a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s elte.	Modelarea Case study	2h
7. Conclusion of the situation at the laboratory	Modelarea Case study	2h

Bibliography:

1. **M. Horgoş,** Masini si utilaje electromecanice, Editur a Risoprint Cluj Napoca, 2007.
2. **C l'awedia Marti,** T'sta r'e a and i proiecta r ea s i'sfearelor e thec t rome ca nce, Atelie rl e l e liplicare a l in i tuu u i Politehnic clu j-N a poca, 1987
3. M**ihai Gafi t and, Spiridon Cret, Barbu Dar** b u d a **n,** Dia g i ag t heC o you are t c on t r o l s y s t e m s a n d c o n t r o l s y s t e m s elor, Edi t you are a t e r a ti on o f the Bucyou areesti on, 1989
4. **N. U-Ficcher,** Vibrati i e s e i e ll or meca nice. It'sarandit's a pl'i e i, ed'ti aura Ca s a candr and d'e tit ie t a. , 19 98

9. Corroboration of 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 adapted and satisfies the requirements imposed by the labour market, being adapted cu mediul economic din egiune concretiza t h eC o you are t c on t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y t h eC o you are t c on t r ol s y s t e m s a n d c on t r o l s y s t e m s a n d c on t r o l s y s t e m s e prob li c at i on s and f ie s w it h the pen t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t r o l s y s t e m s a n d c o n t

10. Evaluation

Activity Type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade
10.4 Course	Periodical check is done for a duration of 1 / 2 / 3 hours. **Written:** **For note 5:** All topics must be treated to minimum standards. **For the note > 5** all subjects must be treated to naxime standards.	"The assessment can be done face-to-face or online" **Week a – 7 – a** Partial VP which is 50% of the FINAL VP **Week a – 14 – a** VP – final	80 %
10.5 Laboratory	**For a grade of 5**, all tests and the final test must be treated to a minimum standard. **For notes > 5** final must be treated to the maximum standard.	"The assessment can be done face-to-face or online" All laboratory work must be performed in order to be able to enter the final VP. It is allowed the recovery of the maximum 2 laboratories overdue before VP – final	20%
10.6 Project			

10.7 Minimum performance standard
• Carrying out works under coordination, to solve specific problems in the field, with the correct evaluation of the volume of lechers, the available resources, the necessary time of completion and the risks in conditions of strict application of the occupational safety and health norms. • Adequate use of the fundamental knowledge of technological methods and processes used in the machine building industry as well as in the electrotechnical industry.

Date of completion : Signature of the course holder : Signature of the laboratory holder :

29.0 8.202 2 Lecturer dr.ing. Teofil Ovidiu LAG Head of works dr.ing. Teofil Ovidiu LAG

Email: tgal@uoradea.ro

Date of approval in the department:
01.09.2022

Signature of the Director of Department
Prof.univ.dr.ing.inf. Hathazi Francis – John

Date of approval in the Faculty Council:
23.09.2022

Signature of Dean
Prof.univ.dr. habil. Mircea Ioan Gordan

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	Electrical engineering
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Electromechanics (at Beius)/Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**INDUSTRIAL ELECTRONIC SYSTEMS**			
2.2 Holder of the subject				Associate Prof.PhD.Castrase Simona Cristina			
2.3 Holder of the academic seminar/laboratory/project				Associate Prof.PhD.Castrase Simona Cristina			
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Vp	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 laboratory	2
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic /laboratory	14

Distribution of time	36
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	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	4
Tutorials	5
Examinations	3
Other activities.	14

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

4. Pre-requisites (where applicable)

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

5. Conditions (where applicable)

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

6. Specific skills acquired

Professional skills	C3.Use of fundamental knowledge of electrotechnics C6.Diagnosis, troubleshooting and maintenance of electrical systems and components
Transversal skills	

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

7.1 The general objective of the subject	The discipline aims to familiarize students with the field of power electronics and especially with electromagnetic converters. Presentation of the fundamental problems of switching the main electronic power devices in terms of minimizing power losses, control methods leading to switching with minimal losses and applications such as voltage converters, voltage converters.
7.2 Specific objectives	Description of the operating principles of the converters Explain and interpret the operating modes of the converters Solve common problems in the field of converters using dedicated software packages and appropriate computer aided design (CAD) tools (ORCAD, MULTISIM) Evaluate the results of using software packages and computer aided design (CAD) tools to solve converter problems, Deepening the knowledge acquired in the course and forming practical skills

8. Contents*

8.1 Course	Teaching methods	No. hours
1. Introductory notions. The place and role of converters in energy flow.	Direct teaching aided by visual methods of	2
2. Power semiconductor elements		2
3. Choice, verification and protection of power semiconductor elements		2
4. dc to dc converters		2
5. Alternating voltage inverters. Single-phase variators		2
6. Alternating voltage inverters. Three-phase variators		2
7. Cyclic converters		2

8. DC voltage variators. The voltage inverter continues to descend	presentation on site	2
9.Current voltage variators .Current voltage voltage variators		2
10. Voltage and frequency converters. The principle of operation and the scheme of principle		2
11. Amplitude modulation single phase inverters		2
12. Amplitude modulation three-phase voltage inverters		2
13. Three-phase amplitude-modulated current inverters		2
14. Durable modulation voltage and frequency converters		2

Bibliography

1 Simona Castrase, M. Călugăreanu, Electronică industrială, ISBN 973-613-236-6, Editura Universităţii din Oradea, 2002.
2. V. Popescu, D. Lascu, D. Negoitescu, Convertoare de putere în comutatie. Aplicatii Editura de Vest, Timişoara, 1999
3. V. Popescu, Electronică de putere, Editura de Vest, Timişoara, 1998**.**
4. P. Constantin, Ş. Bîrcă-Gălăteanu, ş.a. Electronică Industrială, Editura Didactică şi Pedagogică, Bucureşti, 1983
5. A. Kelemen, M. Imecs, Electronică de putere, Editura Didactică şi Pedagogică, Bucureşti, 1983
6. V. Popescu, Stabilizatoare de tensiune în comutatie, Editura de Vest, Timişoara, 1992

8.2 Academic laboratory	Teaching methods	No. of hours
1. Presentation of the laboratory and works. Labor protection.	laboratory applications, simulation program on site and on the	2
2. Control the thyristors with the help of dedicated circuits		2
3. Converters a.c. - c.c.		2
4. Single phase alternating voltage inverters		2
5. DC voltage variator		2
6 Amplitude modulation single phase inverters		2
7. Laboratory recovery. Ending the school situation.		2

Bibliography

1. Simona Castrase, M. Călugăreanu, Electronică industrială, ISBN 973-613-236-6, Editura Universităţii din Oradea, 2002.
2. N.D.Trip, A. Gacsádi, D. Scurtu, Electronică Industrială - îndrumător de laborator, Ed.|Universitătii Oradea, 2005
3. V. Popescu, D. Lascu, D. Negoitescu, Convertoare de putere în comutatie. Aplicatii Editura de Vest, Timişoara, 1999
4. V. Popescu, Electronică de putere, Editura de Vest, Timişoara, 1998

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 that have accredited these specializations. The experience gained in the relations with big employers from Bihor was taken into account in the internship activities of the students.

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: minimum knowledge on the notions about the operating principles of converters and types. For grade 10: thorough knowledge of the correct and complete presentation of knowledge of switching power circuits and interpretation of results. The laboratory activity is completed and marked with a grade of 10	VP Written test	70%
10.5 seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): knowledge of the representation of electronic devices, knowledge of the operation of electronic devices, - minimum knowledge of the use of the electronic simulation program For 10: Acquiring the theoretical knowledge necessary to carry out laboratory work and how to achieve practical applications.15% of the grade from the laboratory is the evaluation of individual topics.	Evaluation of works + test	30%
10.7 Project	-		
10.8 Minimum performance standard: Ability to interpret, design, measure electronic circuits of low / medium complexity.			

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics Beiuș / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		Microwave Technology					
2.2 Holder of the subject		Assoc. prof. Șoproni Vasile Darie					
2.3 Holder of the academic seminar/laboratory/project		-/ Prof. Hathazi Francisc Ioan / -					
2.4 Year of study	4	2.5 Semester	8	2.6 Type of the evaluation	Exam	2.7 Subject regime	Specialized Discipline

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

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	-/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					22 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					5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					5
Tutorials					2
Examinations					3
Other activities.					-

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) - Knowledge of Electromagnetic Field Theory, Electrical Circuits Theory I and II, Electrotechnical Materials, Microwave Techniques, Electrothermies, Electrical and Electronic Measurements, Electrical Machines
4.2 related to skills	- Adequate selection of design methodology, characteristics of components and electrical systems

5. Conditions (where applicable)

5.1. for the development of the course	Laptop, video projector, magnetic board, smart board, free speech, online
5.2.for the development of the academic seminary/laboratory/project	- / access to laboratory microwave equipment in accordance with protection regulations, on-line/ computer network with workstation for each student, network access to the Internet

6. Specific skills acquired	
Professional skills	- C3. Use of fundamental knowledge of electrotechnics - C4. Design of electrical systems and their components - C6. Diagnosis, troubleshooting and maintenance of electrical systems and components
Transversal skills	- CT1. Identification of the objectives to be achieved, available resources, conditions to complete them, working stages, working times, associated deadlines and risks

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 addressed to students from the Electromechanics specialization and aims to present the phenomena of production, transport and use of microwave energy in various industrial applications.
7.2 Specific objectives	Starting from the preconditions imposed by each product subject to industrial microwave processing, the student will be able to analyse the variations of the monitored parameters, useful for optimizing the process and designing microwave ovens.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Properties of dielectrics. Techniques for measuring complex dielectric constant. Variation of complex permittivity depending on humidity, temperature and frequency. Quality factor analysis. Agents and catalysts	Laptop, video projector, free speech. Online	2
2. Theoretical aspects of volume heating. Dissipated power. Propagation factor and penetration depth. Specific heat. Increase temperature factor. Heat and mass transfer phenomena. Penetration depth. Leaks in the walls of the oven	Laptop, video projector, free speech. Online	2
3. Single-mode resonant cavities. The modes generated in the cavity and the quality factor. Impedance adaptation. Determining the parameters by measuring the transmitted power or the reflected power. Rectangular and cylindrical cavities. Coupling slots. Energy transfer and efficiency in a resonant microwave oven.	Laptop, video projector, free speech. Online	2
4-5. Multimode applicators. Field distribution and uniform heating. The quality factor, the intensity of the electric field and the currents in the walls, the power density. Choice of material for the walls of the applicator. Doors and locking mechanisms.	Laptop, video projector, free speech. Online	4
6. Wave applicators with conveyor belt. Parallel plane waves. Wave guides. Mutual impedance. Voltage Standing Wave Ratio S. Examples of conveyor belt applicators	Laptop, video projector, free speech. Online	2
7-8. Special applicator structures. TE10n applicator with two cavities. Applicator: periodic, rectangular TEM, with ridge, disc, dielectric, mobile resonant, spiral, radiant, ellipsoidal and spherical	Laptop, video projector, free speech. Online	4

9. General aspects of the microwave heating circuit, gas discharge phenomena and pressure processing.	Laptop, video projector, free speech. Online	2
10. Pressure microwave processing of sensitive materials at high temperature	Laptop, video projector, free speech. Online	2
11. Automatic control, adjustment and adaptation of the drying process.	Laptop, video projector, free speech. Online	2
12-13. Hybrid systems in industrial applications that use microwave technologies	Laptop, video projector, free speech. Online	4
14. Safety rules adopted for microwave installations	Laptop, video projector, free speech. Online	2

Bibliography

1. Teodor Maghiar, Darie Șoproni – Tehnica încălzirii cu microunde, Editura Universităţii din Oradea, 2003
2. Rulea Gh. – Tehnica frecvenţelor foarte înalte, Ed. Tehnică, București, 1966
3. Rulea Gh. – Tehnica microundelor, Ed. Didactică și Pedagogică, București, 1981
4. Drăgoi Gh. - Tehnica frecvenţelor foarte înalte, Ed. Militară, București, 1979
5. Metaxas A. C. – Industrial Microwave Heating, Peter Peregrinus LTD., 1983
6. Manolescu P., ș. a. – Măsurări electrice și electronice, Ed. Didactică și Pedagogică, București, 1980
7. Adrian Vârtosu – Măsurări cu microunde și optoelectronice, Univ. Politehnica Timișoara, 1996
8. Tudor Palade – Tehnica microundelor, Univ. Politehnica Cluj, 1995
9. Darie Șoproni – Tehnologii cu microunde, on-line, https://e.uoradea.ro/course/view.php?id=2125

8.2 Laboratory	**Teaching methods**	**No. of hours/ Observations**
1.Occupational Safety and Health Administration – technical instruction for microwaves systems	On line. Students will use the microwave installations in the laboratory	2
2. Analysis of the component parts and the operation mode of the laboratory installation for microwave drying or treatment of dielectric materials	On line. Students will use the microwave installations in the laboratory	2
3. Measurement and interpretation of process parameters at - microwave drying of granular products - mixed microwave / hot air drying of granular products	On line. Students will use the microwave installations in the laboratory	2
4. Analysis of the component parts and of the operation of the laboratory installation for soil decontamination. Measurement and interpretation of results	On line. Students will use the microwave installations in the laboratory	2
5. Measurement and interpretation of process parameters to study the influence of high frequency electromagnetic field on soil seed germination processes	On line. Students will use the microwave installations in the laboratory	2
6. Analysis of the component parts and the operation of the laboratory installation for extracting oils from seeds. Measurement and interpretation of results	On line. Students will use the microwave installations in the laboratory	2
7. Measurement and interpretation of process parameters for the extraction of beta-carotene from vegetables (carrots)	On line. Students will use the microwave installations in the laboratory	2
8. Analysis of the component parts and the operation of the laboratory installation for the extraction of oils from vegetable substrate. Measurement and interpretation of results	On line. Students will use the microwave installations in the laboratory	2

9. Measurement and interpretation of results in the extraction of oils from the floral substrate.	On line. Students will use the microwave installations in the laboratory	2
10-11. Analysis of the component parts and the operation of the laboratory installation for the study of microwave susceptor ceramic materials. Measurement and interpretation of results	On line. Students will use the microwave installations in the laboratory	4
12-13. Analysis of the component parts and the operation of the laboratory reactor in the microwave field in order to obtain hybrid materials (conductive, semiconductor or dielectric polymers) by spray pyrolysis processes. Measurement and interpretation of results	On line. Students will use the microwave installations in the laboratory	4
14. Knowledge verification	On line. Students will use the microwave installations in the laboratory	2

Bibliography

1. *** - Project PNII 51087, Modern technologies used to improve the quality of stored agricultural seeds, 2007-2010, project director - Șoproni Darie, University of Oradea
2. Manolescu P., ş. a. - Electrical and electronic measurements, Didactic and Pedagogical Publishing House, Bucharest, 1980
3. Adrian Vârtosu - Microwave and optoelectronic measurements, Univ. Politehnica Timişoara, 1996
4. *** - User manual for the laboratory reactor in the microwave field in order to obtain hybrid materials (conductive, semiconductor or dielectric polymers) by spray pyrolysis processes
5. *** - User manual for the laboratory installation for the study of ceramic microwave supporting materials
6. *** - User manual for the laboratory installation for the extraction of oils from vegetable and floral substrate
7. *** - User manual for the laboratory plant for extracting oils from seeds
8. *** - User manual for the laboratory plant for soil decontamination and accelerating the germination process of soil seeds

8.3 Project	**Teaching methods**	**No. of hours/ Observations**

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

- The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accommodation 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	Exam	Oral examination. On line	80 %
10.5 Academic seminar	-	-	-
10.6 Laboratory	Realization of all labs applications	Knowledge assessment test. On line	20 %
10.7 Project			

10.8 Minimum performance standard:

- Carrying out the works under the coordination of a teacher, in order to solve specific problems in the electrotechnical field with the correct evaluation of the workload, the resources available for the necessary time to complete the risks, under the application of occupational safety and health norms.

- Grade components: Exam (Ex), Laboratory (L)
- Evaluation calculation formula: N = 0.8Ex + 0.2L
- Condition for obtaining credits: N ≥ 5, L ≥ 5

Completion date:
29.08.2022

Date of endorsement in the department:
01.09.2022

Date of endorsement in the Faculty Board:
23.09.2022

SUBJECT DESCRIPTION

1. Data related to the study program

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

2. Data related to the subject

2.1 Name of the subject	Nonconventional equipments and technologies						
2.2 Holder of the subject	Assoc. prof. Pasca Sorin						
2.3 Holder of the academic seminar/laboratory/project	Assoc. prof. Pasca Sorin						
2.4 Year of study	4	2.5 Semester	7	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	Specialized Discipline

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

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

Distribution of time	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	16
Tutorials	-
Examinations	4
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Previous subjects: Physics, Technological methods and procedures, Electromagnetic field theory, Theory of electrical circuits, Electrotechnic materials
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	Teaching activities will take place face to face. The existing multimedia facilities in the classroom are used, i.e. laptop and video projector or smart board. The presentation of the course is accompanied by additional explanations on the classical board.
5.2.for the development of the academic seminary/laboratory/project	

6. Specific skills acquired

Professional skills	▪ **C1.2.** Explaining and interpreting the phenomena presented at the domain disciplines and at the specialized disciplines, using the basic knowledge of mathematics, physics, chemistry ▪ **C3.2.** Explanation and interpretation of the operating modes of static, electromechanical converters, electrical and electromechanical equipment ▪ **C3.3.** Identification of electromechanical systems based on their structure; mathematical modeling, as well as their kinematic and dynamic description ▪ **C3.4.** Assessing the quality and functional performance of electrical systems by specific methods
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 study of some of the most modern electrotechnologies and of the specific electrical equipment
7.2 Specific objectives	▪ knowledge of the basics of the physical phenomena involved in the studied electrotechnological processes ▪ knowledge of the general structure of the electrical equipment specific to the studied technologies ▪ understanding the functioning of complex installations and equipments from the electrical technologies domain ▪ skills regarding the comparative qualitative analysis of some technological processes ▪ skills regarding the calculus of sizing of some subassemblies from the studied installations ▪ formation of skills regarding the design and realization of experimental setup for the study of modern technological processes

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introductory course: Electrotechnologies / Special electrical technologies / Unconventional electrical technologies, history, examples, features, advantages and disadvantages compared to "classical" processes	Presentation with video-projector and additional explanations on the blackboard	2
2. Infrared (IR) heating and drying equipment. IR - characteristics, specific laws, IR sources, types of furnaces / drying installations with IR (tunnel ovens), sizing principles		2
3. Electrotechnologies based on ultrasounds (UUS) applications in industry: UUS characteristics, phenomena that occur at UUS propagation through different media, UUS production. Magnetostrictive and piezoelectric transducers. The general setup of an electroacoustic system		2
4. Electrotechnologies based on ultrasounds (UUS) applications in industry: Applications (dimensional processing, welding and soldering plastics and metals, cleaning - degreasing in ultrasonically activated baths)		2
5. Equipment for electrical metalworking: EDM (Electric Discharge Machine) processing. (Principle of processing, process analysis, EDM with massive electrode. Specific power sources)		2
6. Equipment for electrical metalworking: EDM machines with filiform electrode. Electrical contact processing equipment. Electrochemical processing equipment. Anode-mechanical processing equipment		2
7. Equipment for electrical metalworking. High speed forming equipment. Electromagnetic processing / electromagnetic forming		2

8. Equipment for electrical metalworking. High speed forming equipment. Electrohydraulic processing / electrohydraulic forming	Presentation with video-projector and additional explanations on the blackboard	2
9. Unconventional processes for coating metal surfaces; specific electrical equipment. Electrophoretic varnishing (chemical bonds, process analysis, power supply sources, constant voltage or constant current process, energy balance		2
10. Unconventional processes for coating metal surfaces; specific electrical equipment: Electrostatic painting (electrostatics basics, types of electrostatic coatings, electrostatic painting installations, power supply (HV), adv./disadv.)		2
11. Electrotechnologies using thermal plasma and specific equipment: Thermodynamic characteristics of plasma. Plasma generation. Types of plasmatrons (with electric arc, induction, electronic), construction and power supply variants		2
12. Industrial applications of low temperature thermal plasma; plasma furnaces, remelting for refining, separation of useful components, obtaining metals with high melting point, cutting metals		2
13. Electrical equipment for unconventional welding and soldering processes. Classification of unconventional welding processes. Sheet metal welding with stored energy		2
14. Electron beam equipment: basics, features, equipment, applications		2

Bibliography (selection)

1. I. Şora, N. Golovanov et al – *Electrothermia and Electrotechnologies* (in Romanian), Vol. 2, *Electrotechnologies*, Technical Publishing House, Bucharest, 1999
2. Fl.T. Tănăsescu, C. Ifrim – *Electrotechnologies* (in Romanian), Politehnica Press, Bucharest, 1990
3. I. Şora ş.a.– *Installations for electrotechnologies* (in Romanian), laboratory works, Politehnica University Timişoara, 1994
4. S. Paşca – *Nonconventional electrical technologies and equipment* (in Romanian), Vol. I, University of Oradea Publishing House, 2004
5. S. Paşca – *Nonconventional equipment and technologies* (in Romanian) – lecture notes, (electronic)
6. S. Pasca, V. Fireteanu – *Finite Element Analysis of Successive Induction Heating and Magnetoforming of Thin Magnetic Steel Sheets*, 14th International Symposium on Numerical Field Calculation in Electrical Engineering IGTE 2010, Graz, Austria, Proceedings, pp. 356-361
7. S. Pasca, T. Tudorache, M. Tomse – *Finite Element Analysis of Coupled Magneto-Structural and Magneto-Thermal Phenomena in Magnetoforming Processes*, 6th International Conference on Electromagnetic Processing of Materials EPM 2009, Dresden, Germany, Proceedings, pp. 735-738
8. S. Pasca, T. Vesselenyi, V. Fireteanu, T. Tudorache, P. Mudura, M. Tomse, M. Popa – *Electromagnetic Forming - an Efficient Technology for Metallic Sheet Processing*, Przeglad Elektrotechniczny (Electrotechnical Review), 11/2008, 84, pp. 197-202
9. V. Fireteanu, T. Tudorache, M. Popa, and S. Pasca – *Finite Element Analysis of Aluminum Billet Heating by Rotation in DC Magnetic Fields*, XXIV UIE International Congress, Krakow, Poland, 2008, Proceedings
10. S. Pasca, T. Vesselenyi, V. Fireteanu – *Transient Phenomena in Electromagnetic Forming Processes*, International Scientific Colloquium "Modeling for Electromagnetic Processing" MEP 2008, Hannover, Germany, Proceedings, pp. 315-320.

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Technical norms of work safety specific to electrotechnologies. Presentation of laboratory works		2
2. Study of an infrared heating / drying installation		2
3. Modern equipments which uses ultrasound applications. Determining the parameters of electroacoustic transducers that operate based on the piezoelectric effect		2
4. Modern equipments which uses ultrasound applications. Study of an equipment for cleaning / degreasing parts and components in ultrasonically activated solvent baths / {Determining the parameters of		2

electroacoustic transducers that operate based on the magnetostrictive effect}		
5. Study of the Electric Discharge Machine with massive electrode and of the pulse generators for EDM		2
6. Laboratory equipment for the study of electromagnetic forming process of thin metal sheets / {Numerical modeling of the electromagnetic forming process of thin metal sheets}		2
7. Nonconventional processes for welding metal half-finished products. Study of a classic spot welding equipment (with transformer) and, comparatively, of a spot welding equipment with stored energy		2

Bibliography (selection)

1. I. Şora, N. Golovanov et al – *Electrothermia and Electrotechnologies* (in Romanian), Vol. 2, Electrotechnologies, Technical Publishing House, Bucharest, 1999
2. Fl.T. Tănăsescu, C. Ifrim – *Electrotechnologies* (in Romanian), Politehnica Press, Bucharest, 1990
3. I. Şora ş.a.– *Installations for electrotechnologies* (in Romanian), laboratory works, Politehnica University Timişoara, 1994
4. S. Paşca – *Nonconventional electrical technologies and equipment* (in Romanian), Vol. I, University of Oradea Publishing House, 2004
5. S. Paşca – *Nonconventional equipments and technologies* (in Romanian) – laboratory works, (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 content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- the final grade obtained at the assessment works, Vp	Continuous assessment Vp. - The students will support 2 written works Vp1 and Vp2, in the weeks 7 and 14, each covering 1/2 of the semester subject; - final grade: Vp = (Vp1 + Vp2) / 2 - requirements: Vp1 ≥ 5, Vp2 ≥ 5	75 %
10.5 Laboratory	- the final grade for laboratory activity, L	- the students will take a test (set of questions) on the laboratory works, after which they will obtain the grade TL - another DL grade will be given on the personal laboratory file (complete file, experimental data processing, home works and applications solved correctly) - final grade for the laboratory activity results: L = (TL + DL) / 2 - requirements: TL ≥ 5, DL ≥ 5	25 %
10.8 Minimum performance standard: - Passing the exam (obtaining the credits) involves: Vp1 ≥ 5, Vp2 ≥ 5 and L ≥ 5 - The final grade is calculated as follows: N = 0,75·Vp + 0,25·L			

Completion date: 28.08.2023

Signature of the course holder
Assoc. prof. Sorin Paşca
E-mail: spasca@uoradea.ro

Signature of the laboratory holder
Assoc. prof. Sorin Paşca

Date of endorsement in the department:

29.08.2023

Signature of the head of department

Lecturer dr. ing. Mircea-Nicolae Arion

E-mail: mnarion@gmail.com

Date of endorsement in the Faculty Board:

29.09.2023

Signature of the dean

Prof. habil. Francisc-Ioan Hathazi

E-mail: francisc.hathazi@gmail.com

DISCIPLINE SHEET

1. Facts about the program

1.1 Highereducation institution	**UNIVERSITY OF ORADEA**
1.2 Faculty / Department	**FACULTY OF ELECTRICAL** ENGINEERING **ANDINFORMATION** TECHNOLOGY
1.3 Chair	**ELECTRICAL ENGINEERING**
1.4 Field of study	**ELECTROMECHANICS**
1.5 Cycle of studies	**LICENȚĂ**
1.6 Study program/qualification	**ELECTROMECHANICAL BEIUȘ**

2. Discipline data

2.1 Name of the discipline				**OPERATION AND MAINTENANCE OF ELECTROMECHANICAL** SYSTEMS			
2.2 The holder of the course activities				**Șef lucrări.dr.ing. Gal Teofil Ovidiu**			
2.3 Holder of laboratory/project activities				**Șef lucrări.dr.ing. Gal Teofil Ovidiu**			
2.4 Year of study	**IV**	2.5 Semester	**7**	2.6 Type of assessment	**VP**	2.7 Discipline regime	**Ds**

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

3.1 Număr de ore pe s ă pt ă ă r o ă ăă	**42**	of which: 3.2 course	**2**	3.3 laboratory/project	**1**
3.4 Total hours ofthe learning plan	**42**	of which: 3.5 course	**28**	3.6 laboratory/project	**14**
Distribution ofthetime fund for hours					**62**
Studyby textbook, course support, bibliography andnotes					**20**
Additional documentation inthe library, on specialized electronic platforms andin the field					**10**
Preparation of seminars/laboratories, themes, papers, portfolios and essays					**15**
Tutoriat					**7**
Examinecountries					**10**
Other activitiesi.....					

3.7 Total individual study hours	**62**
3.9 Total hours per semester	**104**
3.10 The numberof creditis	**4**

4. Preconditions (where applicable)

4.1 curriculum	Knowledge of electrical engineering, electric sources, mathematics and physics
4.2 of competiționțe	

5.Conditions (where applicable)

5.1. course development	- "The course can be held face to face or online" - Attendance at least 50% of the courses
5.2. of laboratory /project development	- "The seminar/laboratory/project can be held face-to-face or online" - Mandatory presence at all laboratory hours; - The students come with the laboratory works reviewed - A maximum of 2 papers can be recovered during the semester (30%); - The frequency at laboratory classes below 70% leads to the restoration of the discipline.

6. Specific competences acquired

Professional skills	**C.6.** Carrying out the exploitation, maintenance, service, system integration activities **C6.2** Identification and selection of components for operation, maintenance and integration in electromechanical systems **C6.3** Commissioning, in-service testing, fault analysis and troubleshooting of electromechanical systems **C6.4** Use of methods and technical means to increase the reliability of electromechanical systems
Cross-sectional	CT 1. Identifying the objectives to be achieved, the available resources, the conditions for their completion, the working stages, the working times, the deadlines for achievement and the related risks.

7. Objectives of the discipline (based on the grid of specific competences accumulated)

7.1 The general objective of the discipline	▪ The course "Systems operation and maintenance" aims to present the electromechanical systems from the point of view of the applications in technique and is addressed to the students from the engineering departments the profile ofgeneral lectromechanics and electrotechnics.
7.2 Specific objectives	▪ Being a specialized discipline, its object is the presentation in a unitary framework of the methods of integration, repair, assembly, quality control, lubrication andexploitation of electromechanical systems in general. ▪ In addition to the formation of skills in the field of exploitation of electromechanical systems of their repair, as well as the functioning of the electromechanical systems, in addition to the formation of some skills in the field of exploitation of the electromechanical systems, as well as the modalities of the functioning ofthe electromechanical systems. ▪ The technical documentation must accompanythe installation throughout its existence, starting with the design phase, thus providing information both on the equipment and component parts and on the assembly, commissioning, operation and maintenance of thisdoor.

8. Conţinuturi

8.1.Curs	Teaching methods	Observaţii
CAP.1 Maintenance systems and repair systems. 1.1. General. 1.2. Maintenance and repair systems. 1.2.1. Corrective maintenance systems. 1.1.2. Preventive maintenance systems planned. 1.1.3. Palliative maintenance and repair systems. 1.3. Content of the technical-economic analysis. 1.4. Causes of failure of the electromechanical equipment. 1.5. Technical problems of operation, maintenance and repair of electrical equipment. 1.6. Heating of electrical equipment and appliances. 1.7. Influence of short-circuit currents on electrical installations. 1.8. Electrical contacts .	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours 2h
Head. 2. Basis for keeping productive fixed funds in operation. 2.1. Friction of electromechanical systems. 2.2. Wear of electromechanical systems.		2 hours
Head. 3. **Repairs of electromechanical systems**. 3.1. Receipt for repair.		

3.2. Disassembly for repair. 3.3. Repair of the main mechanical subassemblies of machinery, machinery and installations. 3.4. Repair of the main electrical components of machines, equipment and installations. _____ 3.5. Operation of maintenance and repair of rotating electric machines. 3.6. Organization of repairs to rotating electric machines. _____ 3.7. Practical works that can be carried out for the repairs of the rotating electric motors. 3.8. Tests of electric cars after repairs. 3.9. Coupling of electric motors. _____ 3.10. Repair of control elements. 3.11. Operation, maintenance and repair of starting and adjusting devices. 3.12. Operation, maintenance and repair of electrical mechanisms. 3.13.Operation and maintenance of electromagnetic couplings and brakes. 3.14. Operation, maintenance and repair of transformers. 3.15. Handling of parts in the repair flow	Free exposure, with the presentation of the course on the video projector and on the blackboard	2 hours _____ 2h _____ 2h _____ 2h
CAP.4. Installation of electromechanical systems. 4.1.Installation after repair of mechanical and electrical components. 4.2.Mounting of the mechanisms of transmission of the rotational movement. 4.3.Mounting of mechanisms with translational motion.	Free exposure, with the presentation of the course on the video projector and on the blackboard.	2h
4.4.Mounting of parts that guide surfaces. 4.5.Installation of hydraulic and pneumatic installations. 4.6.Installation of electrical equipment. 4.7. Reception after repairs.	Free exposure, with the presentation of the course on the video projector and on the blackboard.	2h
Head. 5. Quality control of electromechanical systems. 5.1. Quality control and dimensions of parts at repairs. 5.2. Control of installation after repair. 5.3. Tests and tests after interventions. 5.4. Painting of repaired machines and equipment.	Free exposure, with the presentation of the course on the video projector and on the blackboard.	2h
Head. 6. Operation of electromechanical systems. 6.1. Operation and maintenance of repaired machines, equipment and installations. 6.2. Fixing on the foundation of machines and installations.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2h
Head. 7. Anointing of electromechanical systems . 7.1. Mineral oils. 7.2. Greases of consistency .	Free exposure, with the presentation of the course on the video projector and on the blackboard	2h
7.3. Solid lubricants . 7.4. Autolubrefianţii. 7.5. Choice of lubricants for lubrication.	Free exposure, with the presentation of the course on the video projector and on the blackboard	2h
7.6. Lubrication systems and devices. 7.7. Determination of lubricant requirements.	Free exposure, with the	2h

7.8. Oraganizarea operaţiei de lubrefiere .	presentation of the course on the video projector and on the blackboard	

1. P. Andrei – "Operation and maintenance of machines, equipment and installations in the mechanical workshop, Bucharest 1972.
2. C. Cruceru , T Maghiar , A Lezeu , V. Stanilă. – "Technology of repair and maintenance of electromechanical equipment", Didactic and Pedagogical Publishing House, Bucharest 1982
3. C. Cruceru – "Technology of maintenance and repair of equipment, machinery and industrial installations", Volume III, University Publishing House since 1982.Galati
4. D,. Simulescu , M. Huhulescu , V. Caisin , Călin - I." Low voltage devices . Assembly, maintenance and exploitation" , Technical Publishing House Bucharest.
5. , B.H., 1978Jennings – "*The Thermal Environment: Conditioning and Control"*. Harper & Row, .New York
6. Voicu, V., 1999 – " *Ventilation and air conditioning installations".* Technical Publishing House, Bucharest.
7. , R. T., Neri, L.,Anderson Reliability-Centered Maintenance, Elsevier Science Publishing, Ltd., London, England, 1990.
8. Blanchard, B. S., Verma, D., Peterson, E., Maintainability : A KEY to Effective Serviceability and Maintenance Management, John Wiley & Sons, Inc., New York, 1994.
9. Birolini, A., Quality and Reliability of Technical Systems, Springer – Verlag, Berlin, 1994.
10. Idhammar, ,I. Preventive Maintenance, Essential Care and Condition Monitoring Book, IDCON Inc. 1999.
11. Vasiu, T., Vasiu, Gh., Lemle, D., L., Reliability and diagnosis of electromechanical systems, Part I and II, Lito U.P.T. Timişoara, 1998.
12. Vasiu, T., Vasiu, Gh., Maintenance, Lito. U.P.T., Timişoara, 1998.
13. Vasiu, T., Reliability of electromechanical systems, Bibliofor Publishing House, Deva, 2000.
14. Budiul-Berghian A., Vasiu, T., Reliability and maintainability of industrial entities, Infomin Publishing House, Deva, 2008

8.2. Laboratory	Teaching methods	Observaţii
1. Norms of work safety technique for electromechanical equipments. Technical problems of operation, maintenance, and repair of electrical equipment.	Students receive the papers for the laboratory at least a week in advance, study them, record them and give a test from the theoretical side at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher. Free presentation on how to make the montages and check them after the students have made the editing.	2 hours
2. Operation, maintenance and repair of rotating electric machines.		2 hours
3. Getting the exploitation of the bent sheet metal press.		2 hours
4. Operation and maintenance of the pump in the installations.		2 hours
5. Notions of exploitation andmaintenance of the guillotine type scissors.		2 hours
6. Analysis and verification of geometric accuracy of machine tools.		2 hours
7. Measurement of working accuracy at MUCN by executing a nose type sample piece.		

9. Corroboration of 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 found in the curriculum of the specialization of lectromecaithat from other university centers in Romania that have accredited a state of specialization, so knowing the basic notions of Exploitation and Maintenance of Electromechanical Systems is a stringent requirement of employers in the field (IAMT , Stimin Industry, Țecor Industry, Transilvania General Import Export with the platforms from Sudrigiu, Rieni and Ștei , Celestica, Comau, GMAB etc.) in the area of Oradea city and in the area of Oradea Industrial Park as well as in Bihor County.

10. Evaluation

Activity Type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade

10.4 Course	The examination is done scris and orally . Exam tickets will contain at least 3 theory topics **Written** **Note 5.** 1pt. - ex officio - attendance at the course 4pt. – 2 subjects of medium level **Note 7.** Full Note 5 and extra 2pt. – applications from laboratories **Orally. Note 10** Full Note 7 and extra 3pt. - 1 subject of difficult level	"The assessment can be done face-to-face or online" **Examination scris** Students each receive for resolution a form with questions with 3 variants of answer and applications (a total of 10 points you). Grille-type variant.	80 %
10.5 Laborator	- For note 5, he must know how to measure a current, a voltage and read a simple electrical diagram, as well as to adjust his meter on the respective fields. - Notes6 (six) and 7 (seven) increase the complexity of the electrical diagrams of the equipment on which they have not worked. - For the notes 8(eight), 9(nine) and 10(ten) in addition to the above, they must be able to discover a defect or a phenomenon of wear occurring in an electromechanical e equipment, to be able to find out the short circuit current on different circuits, as well as to be able to determine the value of a current on a portion of the circuit without knowing the voltage and without measuring it directly.	"The assessment can be done face-to-face or online" **Test + practical application** The students receive a theory test consisting of 5 questions from the theoretical part ofthe papers that are quoted with two pointse, solving each of the questions, after which if they have obtained at least the grade 5 (five), they can continue with the evaluation on the practical applications. This results in an average forlaboratory activity that will have a weighting in the final grade of the exam	20%
10.6 Project			
10.7 Minimum performance standard			
Course: - Knowledge of the constructive parts and of the principle of operation of various electr omechanical equipments. - The ability to identify a certain type of defect or wear occurred in an electromechanical equipment. - Participation in at least half of the courses. **Laboratory:** - The ability to design and read an electrical diagram. - The ability to perform the troubleshooting of a defect occurring in an electromechanical equipment. - Participation in all laboratory work.			

Date of completion : Signature of the course holder : Signature of the laboratory holder

29.0 8.202 2 Lecturer dr.ing. Teofil Ovidiu Gal Head of works dr.ing. Ovidiu Gal Theophilus

Email: tgal@uoradea.ro

Date of approval in the department: Signature of the Director of Department

01.09.2022 Prof.univ.dr.ing.inf. Hathazi Francis – John

Date of approval in the Faculty Council: Signature of Dean
23.09.2022 Prof.univ.dr. habil. Mircea Ioan nGordan

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	Electrical engineering
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electromechanics Beius/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			PRODUCTION, TRANSPORTATION AND DISTRIBUTION OF ELECTRICAL ENERGY				
2.2 Holder of the subject			Popa Monica				
2.3 Holder of the academic seminar/laboratory/project			Soproni Darie, Szoke Adrian				
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 laboratory	2
3.4 Total of hours from the curriculum	56	of which: 3.5 course	28	3.6 academic laboratory	28

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	22
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	3
Examinations	3
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Electrical installations, Electrical devices
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	on-site
5.2. for the development of the academic laboratory	on-site at local companies in the domain of production and distribution of electrical energy

6. Specific skills acquired	
Professional skills	**C3.1** Description of the operating principles of transformers, static, electromechanical converters, electrical equipment, the main sources of electromagnetic disturbances and the rules regarding electromagnetic compatibility **C3.2.** Explanation and interpretation of the operating regimes of static, electromechanical converters, of electrical and electromechanical equipment **C3. 4.** Assessing the quality and functional performance of electrical systems through specific methods **C6.2.** Identification and selection of components for operation, maintenance and integration in electromechanical systems
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	Component of the electricity production, transport and distribution systems
7.2 Specific objectives	Explaining energy conversion phenomena Description of the principles and operating regimes of the component elements of the electricity transport and distribution systems

8. Contents *

8.1 Course	Teaching methods	No. of hours/ Observations
1. Electrical systems. Electricity production. The impact on the environment	notes on blackboard, Power Point presentation	2
2. Power plants - general presentation. Production of electricity from renewable sources.	notes on blackboard, Power Point presentation	2
3. General considerations regarding the transport and distribution of electricity - requirements, classifications	notes on blackboard, Power Point presentation	2
4. Classification of electrical networks from the point of view of the situation of the neutral with respect to the ground	notes on blackboard, Power Point presentation	2
5. Constructive elements of overhead power lines	notes on blackboard, Power Point presentation	2
6. Constructive elements of cable electric lines	notes on blackboard, Power Point presentation	2
7. The main parameters and the equivalent schemes of the elements of the electricity transport and distribution installations	notes on blackboard, Power Point presentation	2

8. Electrical calculation of distribution networks - structure of distribution networks, connection schemes	notes on blackboard, Power Point presentation	2
9. Electrical calculation of distribution networks in permanent mode - calculation of voltage losses	notes on blackboard, Power Point presentation	2
10. The thermal regime of electric lines	notes on blackboard, Power Point presentation	2
11. Choosing the power line section	notes on blackboard, Power Point presentation	2
12. Power and energy losses in electrical networks	notes on blackboard, Power Point presentation	2
13. The quality of electricity	notes on blackboard, Power Point presentation	2
14. Energy efficiency in electrical distribution	notes on blackboard, Power Point presentation	2
References 1. Monica Popa – Note curs 2. Ghidul pentru instalatii electrice 2018 – editat de Schneider Electric 3. Normative si ordine ANRE		
8.2 Laboratory		
L1. Safety methods in electrical installations.		2
L2. Norms for labor protection and first aid in electricity production, transport and distribution facilities		2
L3. Testing knowledge of labor protection rules		2
L4. Technological and constructive elements of thermoelectric and hydroelectric plants		2
L5. Presentation of CET Oradea equipment - the generation part	Visit at CET Oradea	2
L6. Presentation of CET Oradea equipment – command room	Visit at CET Oradea	2
L7. Production of electricity from renewable sources - solar energy		2
L8. Production of electricity from renewable sources - hydrogen fuel cells		2
L9. Connection station presentation – description, component parts		2
L10. Connection station presentation	Visit at connection station	2

	in Beius	
L11. Presentation of medium voltage cells 20kV		2
L12. Operational management by dispatch of the operation of an electric distribution station	Visit at DEER Beius	2
L13. Technological and constructive elements of LEA and LES		2
L14. Ending the situation at the laboratory - knowledge testing		2
References Colectii de STAS si Normative – SR EN 60364, NP/I7/2011 … Ghidul pentru instalatii electrice 2018 – editat de Schneider Electric		

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

- Knowledge about electricity generation and transportation
- Dimensioning methods according with IEC Standards

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Course	Theoretical	Written exam	60%
10.5 Laboratory	Achievement of laboratory tasks	Activity during laboratory classes	40%
10.6 Minimum performance standard:			
Passing the subject - grade ≥ 5.			

Completion date: 28.08.2023

Signature of subject holder: Assoc. Prof. Monica Popa
E-mail: mpopa@uoradea.ro

Signature of academic laboratory holder: Assoc. Prof. Monica Popa

Date of endorsement in the department: 29.08.2023

Signature of Department Head: Lecturer. Mircea Nicolae Arion
E-mail: mnarion@gmail.com

Date of endorsement in the Faculty Board: 29.09.2023

Signature of Dean: Prof. 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 Electrical Engineering**
1.4 Field of study	**Electrical Engineering**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**ELECTROMECHANICS (at Beius) / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**RENEWABLE SOURCES**					
2.2 Holder of the subject		Prof. univ. dr. ing. habil. IOAN MIRCEA GORDAN					
2.3 Holder of the academic seminar/laboratory/project		Prof. univ. dr. ing. habil. IOAN MIRCEA GORDAN					
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	22 hours
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	5
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	5
Tutorials	-
Examinations	5
Other activities.	-

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Basic knowledge of mathematics, physics, chemistry specific to the field of electrical engineering.
4.2 related to skills	Extensive knowledge of chemistry and physics, but also electrical engineering

5. Conditions (where applicable)

5.1. for the development of the course	The course takes place in the amphitheater, being presented through free speech, an amphitheater that also has a Video Projector, Screen, Blackboard for presentation.
5.2.for the development of the academic seminary/laboratory/project	The practical applications are made using the modern working means existing in the laboratory (Experimental stands, DEGEM workstations, high-performance and current measuring devices, modeling software, etc.).

	Students must have on them the reports they have presented that they will present at the end when they want and take the two tests (theoretically and practically), which may or may not give them the right to participate in the exam. It will be possible to recover only 20% of the works without fee and with the same fee.

6. Specific skills acquired	
Professional skills	▪ **C3. Analysis and development of applications for optimizing industrial processes of electrical engineering using specific software.** - Description of the operating principles of transformers, static converters, electromechanical, electrical equipment, the main sources of electromagnetic disturbances, as well as the rules on electromagnetic compatibility (EMC) of electrical and electronic equipment. - Explaining and interpreting the operating regimes of static and electronic converters, electrical and electromechanical equipment. - Identification of electromechanical systems according to their composition; mathematical modeling, as well as their kinematic and dynamic description. - Assessing the quality and functional performance of electromechanical systems by specific methods. - Design of electromechanical or electrical installations. - Design of an electromechanical installation of low complexity.
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 "Renewable Sources" aims to present energy phenomena in terms of technical applications and is addressed to students in the engineering department, both in electrical engineering and economic engineering in the electrical field. - Being a fundamental specialized discipline, its object is to present in a unitary framework, natural phenomena and resources as well as some applications in this field, necessary for knowing how to design and apply them.
7.2 Specific objectives	- Knowledge, understanding of basic concepts, theories and methods of the field and area of specialization; their proper use in professional communication. - Use of basic knowledge to explain and interpret various types of concepts, situations, processes, projects, etc. associated with the domain. - Application of some basic principles and methods for solving well-defined problems / situations, typical of the field in conditions of qualified assistance. - Appropriate use of standard evaluation criteria and methods to assess the quality, merits and limitations of processes, programs, projects, concepts, methods and theories. - In addition to the skills offered by laboratory meetings in the field of electrical engineering, they also offer the possibility of evaluating errors in experimental determinations, but also the best possible collaboration with colleagues in teamwork. - experimental verification of the basic relations for physical systems encountered in industrial practice and their simulation with the help of software; - performing calculations and determinations; - formation of skills in the energy field by highlighting the phenomena and methods of conversion in terms of conversion of solar, wind, nuclear, geothermal energy, etc. a. in electricity.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction and presentation of the objectives pursued in progress. 1.1. Types of energy and their efficiency.	Interactive lecture; exposure; video projector presentation	2 hours
2. Solar energy. 2.1. Resources and storage. 2.2. Mathematical description of the photovoltaic effect.	Interactive lecture; exposure; video projector presentation	2 hours

3. Solar cells. 3.1. Concentration of solar radiation. 3.2. Solar energy conversion. 3.3. Fusion reaction. 3.4. Seasonal variation. 3.5. The advantages of solar thermal energy.	Interactive lecture; exposure; video projector presentation	2 hours
4. Wind energy. 4.1. Conversion of wind energy into electricity. 4.2. Implementing wind energy. 4.3. Characteristics of the wind source and the available energy potential.	Interactive lecture; exposure; video projector presentation	2 hours
5. Development of wind engineering. 5.1. Wind energy in Romania. 5.2. Construction of wind generators. 5.3. Advantages and disadvantages of using wind energy.	Interactive lecture; exposure; video projector presentation	2 hours
6. Wind turbines. Basic principles. 6.1. Calculation of estimated powers at a certain speed. 6.2. Calculation of wind energy produced, its cost and design solutions.	Interactive lecture; exposure; video projector presentation	2 hours
7. Energy of seas and oceans. 7.1. The energy potential of the oceans. 7.2. Flow and ebb energy. 7.3. Energy resources of ocean waters and seas. 7.4. Forms of hydraulic energy and applications.	Interactive lecture; exposure; video projector presentation	2 hours
8. Geothermal energy. 8.1. The geothermal potential in Romania. 8.2. Heat pumps.	Interactive lecture; exposure; video projector presentation	2 hours
9. Geothermal systems. 9.1. Direct uses of geothermal water. 9.2. Direct use of Geothermal Energy. 9.3. The advantages of the system.	Interactive lecture; exposure; video projector presentation	2 hours
10. Hydrogen. 10.1. Hydrogen and electricity in transport. 10.2. Fuel cells. 10.3. Hydrogen storage. 10.4. Conclusions.	Interactive lecture; exposure; video projector presentation	2 hours
11. Fuel cells. 11.1. Basic parameters and fundamental problems. 11.2. Types of CEC. 11.2. Types of electric cells and electric car.	Interactive lecture; exposure; video projector presentation	2 hours
12. Thermoelectric conversion. 12.1. Thermoelectric effects. The Seebeck, Peltier and Thomson effect. 12.2. Characteristics of thermoelectric converters. 12.3. Thermodynamic analysis of thermoelectric phenomena.	Interactive lecture; exposure; video projector presentation	2 hours
13. Nuclear energy. 13.1. Fission and fusion nuclear reactions. 13.2. Fusion reactions and reactors. 13.3. The nuclear reactor. 13.4. Manufacture of nuclear fuel.	Interactive lecture; exposure; video projector presentation	2 hours
14. The current stage of installation of nuclear power plants 14.1. Nuclear reactor safety and major accidents 14.2. Reprocessing of spent nuclear fuel 15. Exam topics	Interactive lecture; exposure; video projector presentation	2 hours

Bibliography

1. Mircea Pantea, Noi surse de energie regenerabile Volumul 1 ISBN: 978-973-759-580-5, ISBN Vol 1. 978-973-759-581-2, 2008.
2. Hall D. O., House J., Biomasa ca şi combustibil modern, Congresul mondial ISES, Budapesta, 1993.
3. Ursu I., Fizica şi tehnologia materialelor nucleare, Editura Academiei RSR, Bucureşti, 1982.
4. Buta A., Energetică generală şi conversia energiei, Institutul Politehnic "Traian Vuia" Timişoara, Facultatea de Electrotehnică, 1982.

5. Niţu, V., ş. a., Energetică generală şi conversia energiei, Ed. Didactică şi Pedagogică, Bucureşti, 1980.
6. Tomescu F. M., Conversia energiei şi surse, Institutul Politehnic Bucureşti, 1975.
7. Renewable Energy Resources - Twidell John 2021.
8. Erneuerbare Energien: Herausforderungen für Ihr Unternehmen – Georges Hathry 2023.

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the topic and the laboratory.	Practical application. Discussions	2 hours
2. EB-114 board training module. Light-dependent resistance. (LDR).	Practical application. Discussions	2 hours
3. Study of the photodiode.	Practical application. Discussions	2 hours
4. Study of the phototransistor.	Practical application. Discussions	2 hours
5. Study of photovoltaic panels.	Practical application. Discussions	6 hours
6. The study of the conversion of geothermal energy into electricity.	Practical application. Discussions	6 hours
7. Measurement of solar radiation intensity.	Practical application. Discussions	6 hours
8. Final laboratory verification.		2 hours

Bibliography

1. Mircea Pantea, Noi surse de energie regenerabile Volumul 1 ISBN: 978-973-759-580-5, ISBN Vol 1. 978-973-759-581-2, 2008
2. Buta A., Energetică generală şi conversia energiei, Institutul Politehnic "Traian Vuia" Timişoara, Facultatea de Electrotehnică, 1982
3. Tomescu F. M., Conversia energiei şi surse, Institutul Politehnic Bucureşti, 1975
4. Ursu I., Fizica şi tehnologia materialelor nucleare, Editura Academiei RSR, Bucureşti, 1982
5. Niţu, V., ş. a., Energetică generală şi conversia energiei, Ed. Didactică şi Pedagogică, Bucureşti, 1980
6. Niţu, V., Bazele teoretice ale energeticii, Editura Academiei RSR, Bucureşti, 1977
7. Hall D. O., House J., Biomasa ca şi combustibil modern, Congresul mondial ISES, Budapesta, 1993
8. Appelbaum J., Analiza celulelor solare, Congresul mondial ISES, Budapesta, 1993
9. http://www.lpelectric.ro/en/index_en.html
10. www.panosolare.com
11. www.naturenergy.ro
12. www.dual-art.ro
13. http://re.jrc.ec.europa.eu/pvgis/apps3/pvest.php

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 and satisfies the requirements imposed on the labor market, being agreed by the social partners, professional associations and employers in the field related to the bachelor program. The content of the discipline is found in the curriculum of the ELECTROMECHANICS specialization and from other university centers in Romania that have accredited this specialization, so the knowledge of the basic notions is a stringent requirement of the 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	Active participation in developed discussions. Documented arguments. Providing relevant solutions to the issues under debate. Knowledge of the basics on all topics covered.	Oral, online or written assessment. Discussions. Argue.	70%

10.5 Academic seminar	--	--	--
10.6 Laboratory	Written test marked with a minimum of 5. Practical realization of all the requirements imposed by the laboratory work. Well-documented arguments. Reading the required bibliography.	Written test. Practical test. Online test. Discussions. Argue.	30%
10.7 Project	--	--	--
10.8 Minimum performance standard: - obtaining a grade of 5 in each laboratory test; participation and fulfillment of all requirements imposed by each laboratory work; obtaining a grade of 5 in the course tests, as an arithmetic mean of the grades obtained in this type of activity. Knowledge of the basics on all the topics taught.			

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 ELECTRICAL ENGINEERING
1.4 Field of study	ELECTRICAL ENGINEERING
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Electrical Systems Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**USE OF ELECTRICAL ENERGY**			
2.2 Holder of the subject				**Conf.dr.ing. BANDICI LIVIA**			
2.3 Holder of the academic seminar / laboratory / project				**Conf.dr.ing. BANDICI LIVIA – Project** **Conf.dr.ing. BANDICI LIVIA - Laboratory**			
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Ex	2.7 Subject regime	DS

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

3.1 Number of hours per week	6	of which: 3.2 course	2	3.3 laboratory project	1 1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 laboratory project	14 14

Distribution of time	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	**5**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**5**
Tutorials	**4**
Examinations	**3**
Other activities.	**-**
3.7 Total of hours for individual study	**22**
3.9 Total of hours per semester	**78**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Electrical engineering, Electrical installations
4.2 related to skills	Knowledge of the symbols, specific graphics, electrical diagrams.

5. Conditions (where applicable)

5.1. for the development of the course	- Video projector, computer. - The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	- Equipment related to laboratory hours; - Preparation of the report, knowledge of the notions contained in the laboratory work to be performed (synthesis material); - Carrying out all laboratory work. - The laboratory can be held face to face or online.

6. Specific skills acquired	
Professional skills	**C3. Adequate application of knowledge on energy conversion, electromagnetic and mechanical phenomena specific to static, electromechanical converters, electrical equipment, and electromechanical drives** **C.5. Automation of electromechanical processes**

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 "Use of electrical energy" aims to familiarize the students with the study and usefulness of equipment used in lighting systems, respectively in welding. Students have the opportunity to get acquainted with various lighting and welding installations, learn practical skills in their construction, sizing, operation, and maintenance.
7.2 Specific objectives	The laboratory works are designed to provide future engineers with practical skills in the design, construction, research, operation, repair, and maintenance of lighting and welding installations.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
I. General concepts on the use of electrical energy	Projector. Intercalated student contributions are requested on subject-specific topics. Some courses take place by teaching subjects and student debates.	2
II. Production of light radiation 2.1. Light radiation 2.2. Light generating phenomena 2.3. Photometric quantities and units	Idem	2
2.4. Behaviour of light in contact with different materials 2.5. Photometric measurements	Idem	2
III. Electrical light sources 3.1. Classification of light sources 3.2. Incandescent light sources	Idem	2
3.3. Light sources with discharges	Idem	2
3.4. Light sources with gas discharge	Idem	2
IV. Luminaires and equipment used in lighting systems 4.1. Luminaires 4.2. Characteristics of luminaires 4.3. Classification of luminaires	Idem	2
4.4. Luminaires for incandescent filament lamps 4.5. Luminaires for hollow fluorescent lamps	Idem	2
4.6. The main characteristics of luminaires for lamps with high pressure mercury vapour discharge and fluorescent balloon 4.7. Projectors	Idem	2
V. Electrical welding of metals 5.1. Classification of joints 5.2. The phenomenology of the electric arc	Idem	2
5.3. Study patterns of the electric arc in welding processes	Idem	2
5.4. The stability of the source-electric arc system 5.5. The transfer of material in the welding process with fused electrode	Idem	2
5.6. Welding processes 5.6.1. Manual arc welding, with wrapped electrode 5.6.2. Arc welding in controlled atmosphere, with fused electrode	Idem	2
5.6.3. Arc welding in controlled atmosphere 5.6.4. Wrapped arc welding, with fused electrode	Idem	2

Bibliography

1. Livia Bandici, Dorel Hoble - *Utilizări ale energiei electrice în echipamentele de iluminat şi sudură*. Editura Universităţii din Oradea, 2009.
2. Livia Bandici, Dorel Hoble – *Utilizări ale energiei electrice*. Editura Universităţii din Oradea, 2007.
3. C. Bianchi, ş.a – *Sisteme de iluminat interior şi exterior. Concepţie, calcul, soluţii*. Editura MatrixRom, Bucureşti, 2014.
4. C. Bianchi, ş.a – *Proiectarea instalaţiilor de iluminat*. Editura Tehnică, Bucureşti, 1981.
5. C. Bianchi – *Luminoteca. Aspecte fundamentale şi applicative, Vol. I.*. Editura Tehnică, Bucureşti, 1990.
6. T.Maghiar, D.Hoble, L.Bandici – *Instalaţii şi utilizarea energiei electrice*. Editura Universităţii din Oradea, 2000.
7. Th. Miclescu, ş.a. – *Utilizări ale energiei electrice.* Editura Didactică şi Pedagogică, Bucureşti, 1980.
7. I. Şora – *Utilizări ale energiei electrice*. Editura Facla, Timişoara, 1984.
8. Marilena Ungureanu, M. Chindriş, I. Lungu – *Utilizări ale energiei electrice*. Editura Didactică şi Pedagogică, Bucureşti, 1999.
9. Şurianu F.D. – *Utilizarea energiei electrice în industrie şi mari consumatori.* Editura MIRTON, Timişoara, 1997.

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the works and the laboratory for the use of electrical energy. Specific labor protection rules	In the first laboratory hour, the notions related to labor protection specific to electrical lighting and welding installations will be presented by the teacher coordinating the laboratory works. In the second part of the laboratory a theoretical application will be solved.	2
2. Notions of photometry. Applications	Presentation by students of the report prepared (synthesis material). Solving a theoretical application. Interpretation of the obtained results.	2
3. Experimental determination of the characteristics of lighting fixtures	- Presentation by students of the report prepared (synthesis material); - Test regarding the theoretical knowledge related to the laboratory; - Carrying out experimental determinations; - Interpretation of the obtained results.	2
4. Experimental study of incandescent lamps. Modification of the energetic and functional parameters of the incandescent lamp to variations of the voltage of the electric supply network	Idem	2

5. Experimental study of low pressure gas and metal vapor discharge lamps	Idem	2
6. Experimental study of lamps with high pressure gas and metal vapor discharges	Idem	2
7. New trends in electric lighting. LED lamps. Light panels	Idem	2
8. Modification of the luminous flux emitted by the electric lamp	Idem	2
9. Electric arc in alternating current	Idem	2
10. Sizing of an electric arc welding transformer - part I	Idem	2
11. Sizing of an electric arc welding transformer - part II	Idem	2
12. Sizing of an electric arc welding transformer - part III	Idem	2
13. Experimental study of the welding transformer with adjustable magnetic shunt	Idem	2
14. Evaluation of the knowledge acquired during the laboratory hours. Recovery of one missed laboratory.	Handing in and presenting the laboratory papers and. Recovery of a missed laboratory.	2

Bibliography

1. Livia Bandici, Dorel Hoble - *Utilizări ale energiei electrice în echipamentele de iluminat şi sudură*. Editura Universităţii din Oradea, 2009.
2. Livia Bandici, Dorel Hoble, Claudiu Mich – *Utilizarea energiei electrice. Proiectare în sistemele de utilizare*. Editura Universităţii din Oradea, 2010.
3. Livia Bandici, Dorel Hoble – *Utilizări ale energiei electrice*. Editura Universităţii din Oradea, 2007.
4. C. Bianchi, ş.a – *Sisteme de iluminat interior şi exterior. Concepţie, calcul, soluţii*. Editura MatrixRom, Bucureşti, 2014.
5. C. Bianchi, ş.a – *Proiectarea instalaţiilor de iluminat*. Editura Tehnică, Bucureşti, 1981.
6. C. Bianchi – *Luminoteca. Aspecte fundamentale şi aplicative, Vol. I.*. Editura Tehnică, Bucureşti, 1990.
7. T Maghiar, D Hoble, S Paşca, M Popa – *Instalaţii şi utilizarea energiei electrice –Indrumător de laborator.* Editura Universităţii din Oradea 1995.
8. Th. Miclescu, ş.a. – *Utilizări ale energiei electrice*. Editura Didactică şi Pedagogică, Bucureşti, 1980.
9. I. Şora – *Utilizări ale energiei electrice*. Editura Facla, Timişoara, 1984.

8.3 Project	Teaching methods	No. of hours/ Observations
Topic: Design of the electrical lighting installation related to an enclosure where industrial activity is carried out. Bibliography. Project content Chapter I. Interior lighting systems and conditions for achieving a comfortable light microclimate Chapter II. Optimal lighting solutions used in structural and civil engineering. Chapter III. Sizing of interior lighting installations. Chapter IV. Lighting system design. Conclusions		
Presentation of the project theme. Getting started with electrical lighting installations	Discussions on how to write the project.	2
Assignment of initial design data. Norms, guides, and related technical prescriptions	Brief approach to the main problems related to interior lighting systems and the optimal conditions for achieving a comfortable light microclimate.	2
Establishing the conditions imposed on the electrical lighting installation. Choosing the type of source	Explanations on choosing the optimal lighting solutions.	2
Photometric calculation by the use factor method. Sizing of the interior lighting installation	Explanations on choosing the optimal lighting	2

	solutions.	
Quantitative and qualitative checks. Point-by-point calculation	In the first part of the meeting there will be a verification of the theoretical part presented by the students. In the second part there will be a presentation of the notions related to the sizing of lighting installations.	2
Sizing of the outdoor lighting installation of the building	Presentation of calculation equations	2
Final evaluation of the project	Presenting and handing in the elaborated project.	2

Bibliography

1. Livia Bandici, Dorel Hoble, Claudiu Mich – *Utilizarea energiei electrice. Proiectare în sistemele de utilizare*. Editura Universităţii din Oradea, 2010.
2. Livia Bandici, Dorel Hoble - *Utilizări ale energiei electrice în echipamentele de iluminat şi sudură*. Editura Universităţii din Oradea, 2009.
3. Livia Bandici, Dorel Hoble – *Utilizări ale energiei electrice*. Editura Universităţii din Oradea, 2007.
4. C. Bianchi, ş.a – *Sisteme de iluminat interior şi exterior. Concepţie, calcul, soluţii*. Editura MatrixRom, Bucureşti, 2014.
5. C. Bianchi, ş.a – *Proiectarea instalaţiilor de iluminat*. Editura Tehnică, Bucureşti, 1981.
6. C. Bianchi – *Luminoteca. Aspecte fundamentale şi applicative, Vol. I.*. Editura Tehnică, Bucureşti, 1990.
7. T Maghiar, D Hoble, S Paşca, M Popa – *Instalaţii şi utilizarea energiei electrice –Indrumător de laborator.* Editura Universităţii din Oradea, 1995.
8. T.Maghiar, D.Hoble, L.Bandici – *Instalaţii şi utilizarea energiei electrice*. Editura Universităţii din Oradea, 2000.
9. Th. Miclescu, ş.a. – *Utilizări ale energiei electrice*. Editura Didactică şi Pedagogică, Bucureşti, 1980.
10. I. Şora – *Utilizări ale energiei electrice*. Editura Facla, Timişoara, 1984.

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
10.1 Course	- For grade 5: all subjects must be treated to minimum standards; For grades > 5 all subjects must be treated to maximum standards;	The evaluation can be done face to face or online. In order to pass the exam, each subject must be treated for at least grade 5.	60 %
10.2 Laboratory	In the last laboratory class, the students will present the laboratory works performed, i.e. the results obtained.	To be allowed to take part in the exam, all laboratory works must be performed. - laboratory = 20% of the value of the exam grade.	20%
10.3 Project	The project will be handed in during the last week of classes. Students will present the project in front	For grade 6 - the elaborated project respects the format imposed by the elaboration procedure, i.e. the obtained	20 %

	of the teacher, the other students having the opportunity to intervene during the presentation.	results are close to the real ones; For grade 10 - the project is elaborated to maximum standards.	
10.8 Minimum performance standard: Design of components of a low complexity electrical system. Development and testing of an electrical system analysis program. Solving problems specific to electrical installations, correct assessment of workload, available resources, risks in the conditions of the application of occupational safety and health standards.			

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 Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Electromechanics (at Beius)/Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**INDUSTRIAL ELECTRONIC SYSTEMS**						
2.2 Holder of the subject	Associate Prof.PhD.Castrase Simona Cristina						
2.3 Holder of the academic seminar/laboratory/project	Associate Prof.PhD.Castrase Simona Cristina						
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Vp	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 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	8
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	4
Tutorials	10
Examinations	2
Other activities.	1

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

6. Specific skills acquired

Professional skills	C3.Use of fundamental knowledge of electrotechnics C6.Diagnosis, troubleshooting and maintenance of electrical systems and components
Transversal skills	

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

7.1 The general objective of the subject	The discipline aims to familiarize students with the field of power electronics and especially with electromagnetic converters. Presentation of the fundamental problems of switching the main electronic power devices in terms of minimizing power losses, control methods leading to switching with minimal losses and applications such as voltage converters, voltage converters.
7.2 Specific objectives	Description of the operating principles of the converters Explain and interpret the operating modes of the converters Solve common problems in the field of converters using dedicated software packages and appropriate computer aided design (CAD) tools (ORCAD, MULTISIM) Evaluate the results of using software packages and computer aided design (CAD) tools to solve converter problems, Deepening the knowledge acquired in the course and forming practical skills

8. Contents*

8.1 Course	Teaching methods	No. hours
1. Introductory notions. The place and role of converters in energy flow.	Direct teaching aided by visual methods of	2
2. Power semiconductor elements		2
3. Choice, verification and protection of power semiconductor elements		2
4. dc to dc converters		2
5. Alternating voltage inverters. Single-phase variators		2
6. Alternating voltage inverters. Three-phase variators		2
7. Cyclic converters		2

8. DC voltage variators. The voltage inverter continues to descend	presentation on site	2
9.Current voltage variators .Current voltage voltage variators		2
10. Voltage and frequency converters. The principle of operation and the scheme of principle		2
11. Amplitude modulation single phase inverters		2
12. Amplitude modulation three-phase voltage inverters		2
13. Three-phase amplitude-modulated current inverters		2
14. Durable modulation voltage and frequency converters		2

Bibliography

1 Simona Castrase, M. Călugăreanu, Electronică industrială, ISBN 973-613-236-6, Editura Universităţii din Oradea, 2002.
2. V. Popescu, D. Lascu, D. Negoitescu, Convertoare de putere în comutatie. Aplicatii Editura de Vest, Timişoara, 1999
3. V. Popescu, Electronică de putere, Editura de Vest, Timişoara, 1998**.**
4. P. Constantin, Ş. Bîrcă-Gălăteanu, ş.a. Electronică Industrială, Editura Didactică şi Pedagogică, Bucureşti, 1983
5. A. Kelemen, M. Imecs, Electronică de putere, Editura Didactică şi Pedagogică, Bucureşti, 1983
6. V. Popescu, Stabilizatoare de tensiune în comutatie, Editura de Vest, Timişoara, 1992

8.2 Academic laboratory	Teaching methods	No. of hours
1. Presentation of the laboratory and works. Labor protection.	laboratory applications, simulation program on site and on the	2
2. Control the thyristors with the help of dedicated circuits		2
3. Converters a.c. - c.c.		2
4. Single phase alternating voltage inverters		2
5. DC voltage variator		2
6 Amplitude modulation single phase inverters		2
7. Laboratory recovery. Ending the school situation.		2

Bibliography

1. Simona Castrase, M. Călugăreanu, Electronică industrială, ISBN 973-613-236-6, Editura Universităţii din Oradea, 2002.
2. N.D.Trip, A. Gacsádi, D. Scurtu, Electronică Industrială - îndrumător de laborator, Ed.|Universităţii Oradea, 2005
3. V. Popescu, D. Lascu, D. Negoitescu, Convertoare de putere în comutatie. Aplicatii Editura de Vest, Timişoara, 1999
4. V. Popescu, Electronică de putere, Editura de Vest, Timişoara, 1998

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 that have accredited these specializations. The experience gained in the relations with big employers from Bihor was taken into account in the internship activities of the students.

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: minimum knowledge on the notions about the operating principles of converters and types. For grade 10: thorough knowledge of the correct and complete presentation of knowledge of switching power circuits and interpretation of results. The laboratory activity is completed and marked with a grade of 10	VP Written test	70%
10.5 seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): knowledge of the representation of electronic devices, knowledge of the operation of electronic devices, - minimum knowledge of the use of the electronic simulation program For 10: Acquiring the theoretical knowledge necessary to carry out laboratory work and how to achieve practical applications.15% of the grade from the laboratory is the evaluation of individual topics.	Evaluation of works + test	30%
10.7 Project	-		
10.8 Minimum performance standard: Ability to interpret, design, measure electronic circuits of low / medium complexity.			

Completion date:

Date of endorsement in the department:

Date of endorsement in the Faculty Board: