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	Master
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering / Master degree

2. Data related to the subject

2.1 Name of the subject	Modern command and control systems for alternating current electric						
2.2 Holder of the subject	Lecturer phd.eng. Arion Mircea Nicolae						
2.3 Holder of the academic seminar/laboratory/project	- /- / Lecturer phd.eng. Gal Teofil Ovidiu						
2.4 Year of study	1	2.5 Semester	1	2.6 Type of the evaluation	Exam	2.7 Subject regime	Thoroughgoi Thoroughgoi

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	-/-/14
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	-/-/14
Distribution of time					36 hours
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					8
Examinations					8
Other activities.					-
3.7 Total of hours for individual study	**58**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	4				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Minimal knowledge regarding the theory of the electromagnetic field, the theory of electric circuits, the constituent elements of electric circuits and their mode of operation.
4.2 related to skills	Knowledge of symbols, graphics, specific to electrical diagrams.

5. Conditions (where applicable)

5.1. for the development of the course	The course will be presented face to face, in the amphitheater with modern techniques available: Video projector, Screen, Blackboard, Oral speech

5.2.for the development of the academic seminary/laboratory/project	the project will be conducted face to face The practical applications will be made using the existing modern means of work, using numerical modeling software FEMM and/or ANSYS 2D and 3D.) Matlab Simulink. Attendance is mandatory at all project meetings An amount of 30% of the total project meetings may be recovered during the semester; The frequency of the project hours below 70% or the non-completion of the project received through the project theme leads to the restoration of the discipline

6. Specific skills acquired

Professional skills	C.2. The use of modern techniques of acquisition, data processing and their use in complex electrical engineering equipment systems C.3. Analysis and development of applications regarding the optimization of industrial processes of electricity using specific software
Transversal skills	C.T.1. Identification of the objectives to be achieved, the available resources, the conditions for their completion, work stages, working times, deadlines and related 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 "Modern systems of command and control of electric machines" course aims to present the principles and modern methods of command and control of asynchronous machines. The course focuses on modern command (PWM system) and control (scalar and vector control) methods applied to asynchronous machines. Modern trends in the use of alternating current electric machine command and control systems have recently been imposed due to the desire to replace direct current machines in variable speed drive systems with asynchronous machines in more and more fields. The course focuses on the impulse control principle of AC machines, on the scalar and vector control methods of these machines and on the basic configurations of the control and force schemes (the structure of static voltage-frequency converters).
7.2 Specific objectives	▪ The objectives of the discipline are to know and understand the functional relationships in order to create the theoretical and functional models corresponding to the command and control systems of electric machines, by explaining and interpreting their behavior and performing calculations starting from the basic relationships for the physical systems studied with specialized software. ▪ The project activity is focused on specific applications and aims at the formation of skills regarding the physical and numerical modeling of alternating current electric machines.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. COMPONENTS OF HYDRAULIC SYSTEMS		8
2. STRUCTURE OF ELECTRO-HYDRAULIC SYSTEMS		8
3. APPLICATIONS OF ELECTRO-HYDRAULIC SYSTEMS.		4
4. SPECIFIC COMPONENTS OF PNEUMATIC SYSTEMS		4
5. APPLICATIONS OF ELECTRO-PNEUMATIC SYSTEMS.		4

Bibliografie:

1. Arion M. *Sisteme electro-hidro-pneumatice.* Note de curs,
2. Barabas, T., Tripe, V. C.- „*Sisteme şi echipamente electro-hidro-pneumatice de automatizare. Aplicaţii*". Editura Univ.Oradea, 2003;
3. Bălăşoiu, V. – „*Echipamente şi sisteme hidropneumatice de acţionare*", Universitatea Tehnică Timişoara, 1992;
4.Cristea, P. – "*Echipamente hidraulice şi pneumatice de automatizare*", Lito. Institutul Politehnic Iaşi, 1986;
5.Velescu, C. – "*Aparate şi echipamente hidraulice proportionale*", Editura Mirton Timişoara, 2003

	- Test regarding the theoretical knowledge related to the laboratory; - Interpretation of the obtained results.	
2. Study of the operation of the MR pneumatic manipulator within the PN2800 station used in the laboratory;	- Presentation of the paper (synthesis material); - Test regarding the theoretical knowledge related to the laboratory experiments; - Interpretation of the obtained results.	2
3. Study of the operation of the MP pneumatic manipulator within the PN2800 station used in the laboratory;	- Presentation of the paper (synthesis material); - Test regarding the theoretical knowledge related to the laboratory experiments; - Interpretation of the obtained results.	2
4. Study of the operation of the MR pneumatic manipulator within the PN2000 station used in the laboratory;	- Presentation of the paper (synthesis material); - Test regarding the theoretical knowledge related to the laboratory experiments; - Interpretation of the obtained results.	2
5. Study of the semi-automatic operation of the ST2000 station used in the laboratory;	- Presentation of the paper (synthesis material); - Test regarding the theoretical knowledge related to the laboratory experiments; - Interpretation of the obtained results.	2
6. Throttle adjustment of the speed for a linear pneumatic motor;	- Presentation of the paper (synthesis material); - Test regarding the theoretical knowledge related to the laboratory experiments; - Interpretation of the obtained results.	2
7. Closing the situation at the laboratory. Presentation of the laboratory reports.	- Teaching laboratories, by supporting them; - It is allowed to recover 30% of the number of laboratory works.	2

Bibliography

1. Ştefan NAGY- „*Sisteme şi echipamente electro-hidro-pneumatice. Aplicaţii practice*”, Editura Univ.Oradea, 2015

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

- The content of the 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	-Periodic check (duration 1/2/3 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 can be done face to face or online - Week 7: IPV represents 50% of 0.5 VPF; - Week 14: VPII represents 100% of VPF or 50% of VPF (for those with VPI).	- 50 % of 0,5 VP_F; - 100 % of 0,5 VP_F or 50% of VP_F (for the ones with the VP_I).
10.6 Laboratory	-For grade 5: all tests and the final test must be treated to minimum standards; -For grades> 5 all tests and the final test must be treated to maximum standards	The evaluation can be performed face to face or online - All laboratory work must be performed (VP condition); - The share of the laboratory is 50% of the NVP value (for each stage); - Recovery of two outstanding laboratories is allowed.	- The lab grade = 50% of the VP value for each stage.

10.8 Minimum performance standard:

- Carrying out the works under the coordination of a teacher, in order to solve specific problems of maintenance and diagnosis of electro-hydro-pneumatic systems by correctly evaluating the workload, the available resources, the necessary time of completion and the risks, under the conditions of application of the occupational safety and health norms.

Completion date:
02.09.2024

Date of endorsement in the department:
09.09.2024

Date of endorsement in the Faculty Board:
10.09.2024

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	**Master**
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering

2. Data related to the subject

2.1 Name of the subject		**Ethics and integrity in scientific research**					
2.2 Holder of the subject		**Lect. PhD jr. Anca PĂCALĂ**					
2.3 Holder of the academic seminar/laboratory/project		**Lect. PhD jr. PĂCALĂ**					
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Continuous Assessment	2.7 Subject regime	SYD

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

3.1 Number of hours per week	1	of which: 3.2 course	1	3.3 academic seminar/laboratory/project	-
3.4 Total of hours from the curriculum	14	Of which: 3.5 course	14	3.6 academic seminar/laboratory/project	-
Distribution of time					
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					
Tutorials					
Examinations					
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	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- Attendance at least 50% of the courses - The course can be held face to face or online
5.2.for the development of the academic laboratory/project	

6. Specific skills acquired

CT1. Responsibly apply the principles, norms and values of professional ethics in order to achieve the goals and identify the objectives, the available resources, the steps to be done and time spent for finishing the works, the deadlines, and the risks involved.

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

7.1 The general objective of the subject	Knowledge, understanding, explanation and interpretation of concepts specific to ethics and integrity in scientific research for their application in the development of a responsible professional career.
7.2 Specific objectives	The course aims to familiarize students with the notions of ethics, integrity in scientific research; acquiring the knowledge and skills necessary to apply the rules of ethics in scientific research

8. 8. Contents

8.1.Course	Teaching methods	No. of hours/ Observations
The concept of ethics; general aspect of the ethics in scientific research. Regulations on ethics in Romanian universities.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
Integrity in the educational system: integrity standards, promotion of academic integrity, violations of academic integrity, good practices.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Ethical issues of research and publication: plagiarism, forms of plagiarism. Other forms of academic dishonesty.	Free exposure, with the presentation of the course with video projector, on the board or online	4h
Justice and equity in academic organizations and research teams. Legal provisions applicable to the ethics and integrity of scientific research.	Free exposure, with the presentation of the course with video projector, on the board or online	2h
Elaboration of a scientific paper according to the principles of ethics and academic integrity	Free exposure, with the presentation of the course with video projector, on the board or online	2h

Bibliography

1. Ariely, D. (2012). *Adevărul (cinstit) despre necinste. Cum îi minţim pe toţi dar mai ales pe noi înşine*. Bucureşti: Editura Publica
2. Proiect PODCA 2013. Ghid practic privind cercetarea stiintifica
3. Pisoschi, A., Vacariu V, Ioana Popescu I. 2006. Etica în cercetare,
4. Singer, P. (2006), *Tratat de Etică*, Bucureşti: Editura Polirom
5. Șarpe, D., Popescu, D., Neagu, A., Ciucur, V., (2011**),** *Standarde de integritate în mediul universitar, UEFISCDI,* București.
6.Șercan, Emilia, (2017), *Deontologie academică. Ghid practic,* Editura Universității București
7. L.E.N- 1/2011
8. Legea 8/1996 privind drepturile de autor
9. Legea 206/2004 privind buna conduită în cercetarea ştiinţifică, dezvoltarea tehnologică şi inovare

8.2 Academic seminar/laboratory/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

Knowledge of these notions is a stringent requirement of vocational training. The content of the discipline is correlated with the need to train responsible adults, able to apply and respect the principles of ethics and integrity in personal and professional life.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods The evaluation can be done face-to-face or online	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: thorough knowledge of all subjects is required	**Oral examination** Students receive for solving each a form with 2 subjects of theory and an application.	100 %
10.6 Minimum performance standard: Course: - Knowledge of the essential notions in the field of ethics and integrity in scientific research; - Ability to know and recognize the extent of one's rights and obligations as a researcher;			

Completion date:
06.09.2024

Date of endorsement in the department:
09.09.2024

Date of endorsement in the Faculty Board:
10.09.2024

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	Master (2^{nd} cycle)
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering / Master of Science in Engineering

2. Data related to the subject

2.1 Name of the subject				**TECHNICAL ELECTROMAGNETISM**			
2.2 Holder of the subject				**Associate prof.eng. MOLNAR Carmen Otilia**			
2.3 Holder of the academic seminar/laboratory/project				**lecturer PhD eng. STAŞAC Claudia Olimpia / lecturer PhD eng. NOVAC Cornelia–Mihaela**			
2.4 Year of study	I	2.5 Semester	I	2.6 Type of the evaluation	Ex.	2.7 Subject regime	Imposed / Synthesis discipline (I/DSI)

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

3.1 Number of hours per week	**5**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**- / 2 / 1**
3.4 Total of hours from the curriculum	**70**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**- / 28/14**
Distribution of time					**55hours**
Study using the manual, course support, bibliography and handwritten notes					**15**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					**15**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					**15**
Tutorials					
Examinations					**10**
Other activities.					**---**

3.7 Total of hours for individual study	**55**
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	Electromagnetic field theory, superconductors and superconducting systems Electrotechnical Materials, Microwave Technology, Electrothermal
4.2 related to skills	Competences corresponding to the first 4 years of preparation for the degree in Electrical Engineering

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 laboratory/project	The laboratory can be carried out face to face or online. Computer network with workstation for each student, access to software that is studied in the course, network access to the Internet / Project can be carried out face to face or online. 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	C.1. Ensuring skills in the field of electromagnetic field study, at a higher level with direct applicability in technical design, especially in matters of energy quality assurance; C.3. Analysis and development of applications for optimizing industrial processes of electricity using specific software

Transversal skills	CT.1 – 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; CT.2 – Identify roles and responsibilities in a multidisciplinary team and apply effective relationship techniques and teamwork;

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

7.1 The general objective of the subject	Completing and developing the knowledge of electromagnetism, emphasizing the technical aspects of the studied problems. Creative approach to advanced engineering problems in the field of electrical engineering.
7.2 Specific objectives	Ability to apply the notions of mathematics to solving physics problems. Knowledge of experimental data processing and numerical simulation.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1 – Electromagnetic field. Maxwell's equations. Laws of material. Electrodynamic potentials. Lorentz calibration condition.	Laptop, video projector, IQ Board, free speech	2
2. Electromagnetic field energy. Poynting vector. Boundary conditions for electromagnetic field components.	Laptop, video projector, IQ Board, free speech	2
3. Electromagnetic waves in ideal environments. Helmholtz equation. Where spherical. Where plane harmonics. Polarization of electromagnetic waves.	Laptop, video projector, IQ Board, free speech	2
4. Electromagnetic wave in homogeneous, isotropic and absorbent media. Microscopic theory of dispersion and absorption. Skin effect.	Laptop, video projector, IQ Board, free speech	2
5. Electromagnetic wave in anisotropic media.	Laptop, video projector, IQ Board, free speech	2
6. Technical conditions for the correct formulation of an electromagnetic field problem: Technical boundary conditions. Sources.	Laptop, video projector, IQ Board, free speech	2
7. Technical conditions for the correct formulation of an electromagnetic field problem for coupled problems: Technical boundary conditions	Laptop, video projector, IQ Board, free speech	2
8. Electrostatic models: Scalar electric potential. Boundary conditions for scalar electric potential. Potential equipment. Capacity calculation.	Laptop, video projector, IQ Board, free speech	2
9. Electrokinetic models: Equipotential lines. Field lines. Calculation of losses and resistances. Coupling with heating problems in 2D structures.	Laptop, video projector, IQ Board, free speech	2
10. Stationary magnetic field models: Scalar and vector magnetic potential. Boundary conditions for the vector magnetic potential.	Laptop, video projector, IQ Board, free speech	2
11. Stationary magnetic field models: Calculation of magnetic field energy, inductances and forces. Approximations of the model.	Laptop, video projector, IQ Board, free speech	2
12. Quasistationary magnetic field models: The vector magnetic potential. The integral equation of eddy currents.	Laptop, video projector, IQ Board, free speech	2
13. Quasi-stationary magnetic field models: Calculation of eddy current losses. Coupling with heating problems. Approximations of the model. 2D structures.	Laptop, video projector, IQ Board, free speech	2
14. Ending the course with a recapitulation of the theoretical aspects studied and the preparation of details regarding the conduct of the exam	Laptop, video projector, IQ Board, free speech	2

Bibliography

1. Leuca T., **Carmen Otilia Molnar**, Arion M. N. – Elemente de bazele electrotehnicii. Aplicaţii utilizând tehnici informatice. Editura Universităţii din Oradea, 2014, pag. 472, ISBN 978-606-10-1284-8

2. Carmen O. Molnar - Teoria câmpului electromagnetic, Editura Universităţii din Oradea, 2005, pag.223, ISBN 973-613-833-X

3. Leuca, T. – Elemente de teoria câmpului electromagnetic. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002

4. Francisc Ioan Hathazi, Vasile Darie Șoproni, Mircea Nicolae Arion, **Carmen Otilia Molnar**, Supraconductori și sisteme supraconductoare. Fenomenul supraconductibilității și a diamagnetismului perfect, Editura Universității din Oradea, ISBN 978 – 606 – 10 – 1854 – 3, 2016, 2016

5. Leuca T., Hănţilă F.I., Livia Bandici, **Carmen Molnar** - Bazele electrotehnicii. Editura Mediamira, Cluj–Napoca, 2007, pag.212, ISBN 978–973–713–189–8

6. Francisc Ioan Hathazi, Mircea Nicolae Arion, Vasile Darie Șoproni, **Carmen Otilia Molnar**, Elemente de teoria circuitelor electrice. Note de curs, Editura Universității din Oradea, ISBN 978 – 606 – 10 – 1855 – 0, 2016

7. F.Hantila, T.Leuca, C.Ifrim, "Electrotehnică teoretica", vol. I, Editura Electra, 2002, ISBN 973-8067-69-3

8. F.Hantila, “Câmpul magnetic în structuri cu magneți permanenți”, Editura Electra, 2004, ISBN 973-7728-22-X
9. F.Hantila, M.Vasiliu, “Campul electromagnetic variabil in timp”, Editura Electra, 2005, ISBN 973-7728-48-3
10. Simion, E. - Interferenta Electromagnetica. Ed. Casa Cartii de Stiinta, Cluj-Napoca, 1999
11. Munteanu, C., Topa, V., Grindei, L., Advanced Numerical Computation Methods in EMC, Ed. Casa Cărţii de Ştiinţă, Cluj-Napoca, 2001
12. **Carmen O. Molnar –** Electromagnetism Tehnic, Notite de curs Oradea 2024

8.2. Seminar	Teaching methods	No. of hours/ Observations

8.3. Laboratory	Teaching methods	No. of hours/ Observations
1. Laboratory presentation. Introducing and familiarizing students with numerical simulation programs for 2D and 3D electromagnetic field problems	Free speech, use of computer network from the laboratory equipment	2
2. Introduction to the 2D FEMM Simulator 4.2	Free speech, use of computer network from the laboratory equipment	2
3. Numerical analysis of the electromagnetic field in electrostatic regime in 2D structures. Rectangular capacitor application	Free speech, use of computer network from the laboratory equipment	2
4. Numerical analysis of the electromagnetic field in electrostatic regime in 2D structures. Application of capacity calculation between two power lines	Free speech, use of computer network from the laboratory equipment	2
5. Numerical analysis of the electromagnetic field in stationary magnetic regime in 2D structures. Application of the calculation of an electromagnet	Free speech, use of computer network from the laboratory equipment	2
6. Numerical analysis of the electromagnetic field in stationary magnetic regime in 2D structures. Application of induction heating of semi-finished products	Free speech, use of computer network from the laboratory equipment	2
7. Numerical analysis of the electromagnetic field in stationary magnetic regime in 2D structures. Three-phase transformer application	Free speech, use of computer network from the laboratory equipment	2
8. Numerical analysis of the electromagnetic field in stationary magnetic regime in 2D structures. Magnetic bearing application	Free speech, use of computer network from the laboratory equipment	2
9. Introduction to ANSYS 3D Simulator	Free speech, use of computer network from the laboratory equipment	2
10. Numerical analysis of the electromagnetic field in electrostatic regime in 3D structures. Capacity calculation application	Free speech, use of computer network from the laboratory equipment	2
11. Numerical analysis of the electromagnetic field in electrostatic regime in 3D structures. Application of the calculation of an electromagnet	Free speech, use of computer network from the laboratory equipment	2
12. Numerical analysis of the electromagnetic field in electrostatic regime in 3D structures. Electromagnetic induction heating application	Free speech, use of computer network from the laboratory equipment	2
13. Numerical analysis of the electromagnetic field in electrostatic regime in 3D structures. Electromagnetic induction heating application	Free speech, use of computer network from the laboratory equipment	2
14. Checking the knowledge gained and concluding the situation in the laboratory. Recovery of laboratory works.	Free speech, use of computer network from the laboratory equipment	2

Bibliography

1. Leuca T., **Carmen Otilia Molnar**, Arion M. N. – Elemente de bazele electrotehnicii. Aplicaţii utilizând tehnici informatice. Editura Universităţii din Oradea, 2014, pag. 472, ISBN 978-606-10-1284-8
2. Carmen O. Molnar - Teoria câmpului electromagnetic, Editura Universităţii din Oradea, 2005, pag.223, ISBN 973-613-833-X
3. Leuca, T. – Elemente de teoria câmpului electromagnetic. Aplicaţii utilizând tehnici informatice, Editura Universităţii din Oradea, 2002
4. Francisc Ioan Hathazi, Vasile Darie Șoproni, Mircea Nicolae Arion, **Carmen Otilia Molnar**, Supraconductori și sisteme supraconductoare. Fenomenul supraconductibilității și a diamagnetismului perfect, Editura Universității din Oradea, ISBN 978 – 606 – 10 – 1854 – 3, 2016, 2016
5. Leuca T., Hănţilă F.I., Livia Bandici, **Carmen Molnar** - Bazele electrotehnicii. Editura Mediamira, Cluj–Napoca,

2007, pag.212, ISBN 978–973–713–189–8
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7. F.Hantila, T.Leuca, C.Ifrim, "Electrotehnică teoretică", vol. I, Editura Electra, 2002, ISBN 973-8067-69-3
8. F.Hantila, "Câmpul magnetic în structuri cu magneți permanenți", Editura Electra, 2004, ISBN 973-7728-22-X
9. F.Hantila, M.Vasiliu, "Campul electromagnetic variabil in timp", Editura Electra, 2005, ISBN 973-7728-48-3
10. Simion, E. - Interferenta Electromagnetica. Ed. Casa Cartii de Stiinta, Cluj-Napoca, 1999
11. **Carmen O. Molnar –** Electromagnetism Tehnic, Notite de curs Oradea 2024.
12. ***, Manual FEMM 4.2 și aplicații
13. ***, Documentație Soft profesional ANSYS 3D

8.4. Project	Teaching methods	No. of hours/ Observations
1. Recapitulation of knowledge of the Matlab programming language and presentation of the Mathcad programming language	Free exposure, with a presentation on how to solve problems on the board or online	2
2. Realization of the mathematical calculation and implementation in Matlab (Mathcad) of the intensity of the magnetic field in an external point located at the distance x from the axis of an infinitely long rectilinear conductor traveled by the current i and located in the air.	Free exposure, with a presentation on how to solve problems on the board or online	2
3. Calculate the intensity of the magnetic field at a point on the axis of symmetry of a circular plane of radius a, traversed by the current I. Graph its variation as a function of the distance from the plane of the coil and calculate the maximum value of the intensity magnetic field. (Use Matlab or Mathcad)	Free exposure, with a presentation on how to solve problems on the board or online	2
4. Calculate the inductance of a single-phase line with the distance between the axes of the conductors equal to d and the radius a using Matlab or Mathcad.	Free exposure, with a presentation on how to solve problems on the board or online	2
5. Mathematical calculation and implementation in Matlab (Mathcad) of the inductance of an N-coil coil which is uniformly wound on a rectangular section tor (the material of which the tor is composed is linear and has magnetic permeability m.)	Free exposure, with a presentation on how to solve problems on the board or online	2
6. Calculation of the scattering inductances of two identical cylindrical coils placed on a closed magnetic core. (The two coils are flowing in the opposite direction). (Use Matlab or Mathcad)	Free exposure, with a presentation on how to solve problems on the board or online	2
7. Teaching and supporting projects.	Free exposure, with a presentation on how to solve problems on the board or online	2

Bibliography

1. Leuca T., Carmen Otilia Molnar, Arion M. N. – Elemente de bazele electrotehnicii. Aplicaţii utilizând tehnici informatice. Editura Universităţii din Oradea, 2014, pag. 472, ISBN 978-606-10-1284-8
2. Carmen O. Molnar - Teoria câmpului electromagnetic, Editura Universităţii din Oradea, 2005, pag.223, ISBN 973-613-833-X
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12. Ivanov, Virginia, Aplicaţii în Mathcad şi Matlab, vol. I, Ed. Universitaria, Craiova, 2007
1. 13. Carmen O. Molnar – Electromagnetism Tehnic, Notite de curs Oradea 2024.

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

- The content of the discipline is in accordance with what is taught in other profile faculties both from the University of Oradea and from other university centers in the country and abroad. 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	50 %
10.5 Seminar	-	-	-
10.6 Laboratory	Final evaluation test	The evaluation can be done face-to-face or online. Oral examination of students	20 %
10.7 Project	Oral examination	Oral examination - Project presentation	30%
10.8 Minimum performance standard: • Carrying out the works under the coordination of a teacher, in order to solve specific problems in the electrical 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.			

Course owner's signature

Assoc.Prof.eng. Carmen Otilia MOLNAR
e-mail: cmolnar@uoradea.ro

Signature of the laboratory owner

Lecturer eng. Claudia Olimpia STAȘAC
e-mail: cstasac@uoradea.ro

Completion date:
03.09.2024

Signature of the project owner

Lecturer eng. Cornelia–Mihaela NOVAC
e-mail: mnovac@uoradea.ro

Date of endorsement in the department:
09.09.2024

Signature of the Department Director

Lecturer eng. Mircea Nicolae ARION
e-mail: marion@uoradea.ro

Date of endorsement in the Faculty Board:
10.09.2024

Dean's signature

Assoc.Prof.eng. Eugen Ioan GERGELY
e-mail: egergely@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	Master (2st cycle)
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering / Master of Science in Engineering

2. Data related to the subject

2.1 Name of the subject		Techniques and Equipment for Energy Quality					
2.2 Holder of the subject		Assoc. prof. Șoproni Vasile Darie					
2.3 Holder of the academic seminar/laboratory/project		-/ Assoc.prof. Șoproni Vasile Darie/-					
2.4 Year of study	2	2.5 Semester	3	2.6 Type of the evaluation	Exam	2.7 Subject regime	THD Discipline

THD – Thoroughgoing Disciplines

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 hours
Study using the manual, course support, bibliography and handwritten notes					21
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					21
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					7
Examinations					6
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) - Knowledge of Electrical Circuit Theory I and II, Electrical Equipment, Electrical Installations, Industrial Automation, Production, Transport and Distribution of Electricity, Use of Electricity, Industrial Energy and Non-Polluting Energy Sources, Modern Electrothermal Systems, Synthesis of Electrical Equipment and Systems
4.2 related to skills	- Adequate selection of the design methodology and the characteristics of the components of the electrical systems

5. Conditions (where applicable)

5.1. for the development of the course	Laptop, video projector, magnetic board, smart board, free speech, online The course can be hold face to face or on-line platform https://e.uoradea.ro/
5.2.for the development of the academic seminary/laboratory/project	Online / computer network with Workstation for each student, access to softwares that is useful in the course, access to the Internet, online / - The laboratory can be hold face to face or on-line platform https://e.uoradea.ro/

6. Specific skills acquired	
Professional skills	C1. Providing skills in the study of the electromagnetic field, at a higher level, with direct application in superior engineering design, particularly in matters concerning the assurance of the quality of energy C4. Use of measurement techniques of electrical and non-electrical quantities and data acquisition systems in electrical systems C5. Equipment design in electrical engineering, design of conversion systems and use of unconventional sources
Transversal skills	CT2. Identification of the roles and responsibilities in a multidisciplinary team and use of relationship and effective working techniques in the team

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

7.1 The general objective of the subject	The course is addressed to students from the Advanced Systems in Electrical Engineering specialization and aims to present studies on establishing best practices for the conversion of unconventional energies into electrical or thermal energy.
7.2 Specific objectives	Starting from the preconditions imposed by each case, the student will be able to analyse the variations of the monitored parameters, useful for the design of installations for the production of electricity from electro-ecological sources.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1-2. National electricity generation, transmission and distribution network. History, current situation, future trends	Laptop, video projector, free speech. Online	4
3. Structure of electricity distribution networks	Laptop, video projector, free speech. Online	2
4. Performance indicators that characterize continuity in power supply	Laptop, video projector, free speech. Online	2
5. Electricity quality. Overview	Laptop, video projector, free speech. Online	2
6. Technical quality of electricity power	Laptop, video projector, free speech. Online	2
7. Commercial quality of the distribution service	Laptop, video projector, free speech. Online	2
8. Monitoring the quality of the electrical power distribution service	Laptop, video projector, free speech. Online	2

9. Comparative analysis of the electrical power distribution service	Laptop, video projector, free speech. Online	2
10-11. Global energy consumption. Consumption reduction trends; the use of clean energy that provides security, prosperity and environmental protection	Laptop, video projector, free speech. Online	4
12-13. Energy efficiency in industry. Intelligent technologies using integrated projects, innovative methods of replacing coal with natural gas or solar electricity	Laptop, video projector, free speech. Online	4
14. Energy efficient projects using co-generation technologies and energy loss recovery	Laptop, video projector, free speech. Online	2

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[12] http://www.rmi.org/rmi/FlexEfficiencyTechnologyImportantStepForwardRenewables

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[14] Michael Potts, *The Road to the New Era*, Solutions Journal, Rocky Mountain Institute, vol.6, no. 1, 2013, http://www.rmi.org/summer_2013_esj_road_to_new_energy_era_main

8.2 Academic seminar	**Teaching methods**	**No. of hours/ Observations**

8.3 Laboratory	**Teaching methods**	**No. of hours/ Observations**
1.Occupational Safety and Health Administration – technical instruction	On line. Use the equipment provided by the laboratory	2
2. Electric power quality	On line. Use the equipment provided by the laboratory	2
3. Familiarization with the Lucas-Nulle Labsoft UniTrain program dedicated to the analysis of laboratory equipment in the field of electrical engineering that uses renewable energies	On line. Use the equipment provided by the laboratory	2

4. Determining the quality parameters of electricity. Methods for analysing the quality of electrical power	On line. Use the equipment provided by the laboratory	2
5. Measurement techniques. High-performance information acquisition systems. Monitoring the quality of electrical power	On line. Use the equipment provided by the laboratory	2
6-7. Monitoring the operating parameters of a wind farm	On line. Use the equipment provided by the laboratory	4
8-9. Analysis in different operating conditions of the parameters of photovoltaic panels	On line. Use the equipment provided by the laboratory	4
10-11. The study of a wind generator. Qualitative analysis of measured values	On line. Use the equipment provided by the laboratory	4
12-13. Serial, parallel and mixed connection of photovoltaic panels. Methods for optimizing their efficiency	On line. Use the equipment provided by the laboratory	4
14. Calculation of the reduction of harmful gas emissions (reduction of the greenhouse effect) by replacing the conventional system with the studied electro-ecological system.	On line. Use the equipment provided by the laboratory	2

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3. https://www.ge.com/renewableenergy/home
4. http://cfd2012.com/rotating-wind-turbine.html
5. https://ae01.alicdn.com/kf/48V-60V-7-5KVA-6KW-foot-power-pure-sine-wave-power-frequency-inverter-circuit-board-mainboard.jpg
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7. Mihoc-Geci Ferencz - Analiza comparativa între anii 2011 si 2012 a distributiei de energie electrica pe raza Centrului de Exploatare si Masura Oradea, Disertație, 2013, coordonator Șoproni Darie
8. http://www.anre.ro/ Standard de performanta pentru serviciul de distributie a energiei electrice
9. Kiss Geza Levente –Monitorizarea parametrilor de funcționare a unei centrale eoliene de laborator, Disertație, 2013, Coordonator Șoproni Darie
10. Malița Mircea - Simularea funţionării instalaţiilor fotovoltaice cu programul RETScreen considerând orientarea panourilor, Disertație, 2014, coordonator Șoproni Darie
11. Marian Sebastian - Modelarea unui sistem fotovoltaic de microputere, Disertație, 2014, coordonator Șoproni Darie
12. Oraș Vasile - Proiectarea și racordarea unei centrale electrice fotovoltaice la sistemul energetic național, Disertație, 2017, coordonator Șoproni Darie
13. Silaghi Dănuț – Cogenerarea energiei electrice și termice din biogaz, Disertație, 2013, coordonator Șoproni Darie
14. Vlad – Proiectarea și realizarea unui generator eolian, Disertație, 2014, coordonator Șoproni Darie
15. Kotheles Arthur – Metode de reducere a consumului de energie, Disertație, 2014, coordonator Șoproni Darie

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	75 %
10.5 Academic seminar			
10.6 Laboratory	Realization of all labs applications	Knowledge assessment test. On line	25 %

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: $N = 0.75Ex + 0.25L$;
- Condition for obtaining credits: $N \geq 5$, $L = \geq 5$

Completion date:
03.09.2024

Date of endorsement in the department:
09.09.2024

Date of endorsement in the Faculty Board:
10.09.2024

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	Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Master (2nd cycle)
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering / Master of Science in Engineering

2. Data related to the subject

2.1 Name of the subject	**ENERGY CONVERSION AND USE SYSTEMS - PROJECT**						
2.2 Holder of the subject	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.3 Holder of the academic seminar/laboratory/project	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Vp.	2.7 Subject regime	THD

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

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

Distribution of time	36 hours
Study using the manual, course support, bibliography and handwritten notes	
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
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	Static Converters, Renewable sources, Energy conversion and use systems
4.2 related to skills	Competences corresponding to the first year of preparation for the master in Advanced Systems in Electrical Engineering.

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	C5. Design of equipment in the field of electrical engineering and systems for the conversion and use of unconventional sources.
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 presents the fundamental aspects of the possibilities of conversion and use of electricity having as primary source renewable energies.
7.2 Specific objectives	- Presentation of the principles of conversion and use of electricity having as primary source renewable energies. - Knowledge, understanding and interpretation of aspects regarding the configurations of energy converters used in the field of renewable energies and their control methods. - Analysis of energy conversion circuits using specialized software; - Preparation of a project in the field of renewable energy use

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Presentation of the proposed project themes. Details regarding the realization of the project. Choosing the design theme.	Lecture interactive / Online	2
Presentation of some theoretical and practical notions necessary for the realization of the projects.	Lecture interactive / Online	2
Discussions on project initiation, search and use of bibliography.	Interactive lecture, individual work / Online	2
Realization of projects (during this period the student goes through the necessary stages to realize the project under the guidance of the teacher).	Interactive lecture, individual work / Online	6
Presentation of projects. Discussions. Final remarks on the projects. Scoring them.	Interactive / Online Lecture	2
Topic1. Design of a power supply system using photovoltaic panels. Theme 2. Power supply of a modern weather station using wind energy. Theme 3. The car of the future: clean life = clean energy. Electric car based on solar panels Theme 4. Power supply of a mountain hut using the hydrographic potential of the area. Theme 5. Design of a static converter for connecting photovoltaic panels to the power supply. Topic 6. Study of a photovoltaic plant using MATLAB / Simulink		

1. Marin Tomșe – Sisteme de conversie și utilizare a energiei electrice. https://prof.uoradea.ro/mtomse
2. Victor Drăgan, Victor Buchiu - Energiile regenerabile si utilizarea acestora, Editura Ceres, București, 2012.
3 Nicu Bizon – Sisteme optimizate pentru conversia energiei curate, Editura Matrix Rom, București, 2018.
4. Vatra Fănică, ș.a. - Integrarea si funcționarea centralelor eoliene si a instalațiilor fotovoltaice in sistemul electroenergetic, Editura S.I.E.R., București, 2012.
5. Surse regenerabile de energie - http://ener-supply.eu/downloads/ENER_handbook_ro.pdf,
6. Site-uri Internet cu informație specifică surselor de energie regenerabile și a convertoarelor de putere.

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course			
10.5 Academic seminar			-
10.6 Laboratory			
10.7 Project	1. The activity carried out and the verification along the way of the realization of the project 2. The result of the final evaluation of the project	Tests in progress / Online Presentation and support of the project / Online	30% 50% 20% of the mark for the laboratory is awarded for the successful completion of the individual study topic
10.8 Minimum performance standard: Project - Requirements for grade 5 :: Correct choice of power converter configuration required to achieve the chosen project theme. - Knowledge of the main relationships for their sizing. A coherent project structure.			

Completion date
02.09.2024

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

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

Date of endorsement in the department:
10.09.2024

Signature of the department director
Ș:L.dr.ing. Burcă Adrian
9aburca@uoradea.ro

Date of endorsement in the department:
09.09.2024

Signature of the department director
Ș. L. Mircea Arion
e-mail: marion@uoradea.ro

Date of endorsement in the Faculty Board:
10.09.2024

Signature of the Dean
Conf.dr.ing. Gergely Eugen
e-mail: egergely@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	Electrical Engineering
1.4 Field of study	Electrical engineering
1.5 Study cycle	Master (2nd cycle)
1.6 Study program/Qualification	Advanced Systems in Electrical Engineering / Master of Science in Engineering

2. Data related to the subject

2.1 Name of the subject	**ENERGY CONVERSION AND USE SYSTEMS**						
2.2 Holder of the subject	**S. l. dr. ing. TOMSE MARIN TITUS**						
2.3 Holder of the academic seminar/laboratory/project							
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex.	2.7 Subject regime	THD

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

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

Distribution of time	47 hours
Study using the manual, course support, bibliography and handwritten notes	24
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	2
Examinations	3
Other activities.	-

3.7 Total of hours for individual study	**47**
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	Static Converters, Renewable sources
4.2 related to skills	Competences corresponding to the first year of preparation for the master in Advanced Systems in Electrical Engineering.

5. Conditions (where applicable)

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

6. Specific skills acquired	
Professional skills	C5. Design of equipment in the field of electrical engineering and systems for the conversion and use of unconventional sources.
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 presents the fundamental aspects of the possibilities of conversion and use of electricity having as primary source renewable energies.
7.2 Specific objectives	- Presentation of the principles of conversion and use of electricity having as primary source renewable energies. - Knowledge, understanding and interpretation of aspects regarding the configurations of energy converters used in the field of renewable energies and their control methods. - Analysis of energy conversion circuits using specialized software; - Preparation of a project in the field of renewable energy use

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Introduction. Renewable energy sources. Renewable energy sources in the global energy balance. Conversion of renewable energies into electricity. The need to change the parameters of the electricity obtained for the supply of various consumers or for injection into the supply network.	Interactive lecture + video projector / Online	2
Chapter 2. Solar energy conversion. Characteristics of solar radiation. Indirect conversion of solar energy into electricity. Solar power plants.	Interactive lecture + video projector / Online	2
Direct conversion of solar energy into electricity. Photovoltaic cells. Components of photovoltaic systems. Examples	Interactive lecture + video projector / Online	2
Chapter 3. Power converters used for solar energy conversion. DC-AC converters for photovoltaic systems. Single phase inverters. Three-phase inverters.	Interactive lecture + video projector / Online	2
DC-DC converters for photovoltaic systems. Converters c.c. - c.c. without insulation Converters c.c. - c.c. with insulation. Maximum power transfer to solar installations	Interactive lecture + video projector / Online	2
Chap.4. Wind energy conversion. Evaluation of wind potential. Wind turbines	Interactive lecture + video projector / Online	2
Wind energy conversion systems. Variants of electronic power converters for wind systems.	Interactive lecture + video projector / Online	2
CA-CA converters for wind systems.	Interactive lecture + video projector / Online	2
Electronic control of wind systems. Power control. Power converter control. Network synchronization.	Interactive lecture + video projector / Online	2
Chapter 5. Hybrid power generation systems.	Interactive lecture + video projector / Online	2
Chapter 6. Circuits for charging, monitoring and protecting the batteries needed to store electricity.	Interactive lecture + video projector / Online	2
Chapter 7. Power filters to eliminate harmonics generated by energy conversion circuits. Passive filter. Active filters. Protection of equipment against disturbances.	Interactive lecture + video projector / Online	2
Chapter 8. Conversion of geothermal energy into electricity.	Interactive lecture + video projector / Online	2
Chapter 9. Conversion from other renewable energy sources to electricity. Power generation using hydrogen engines. Nuclear energy. Electronic power circuits required for such applications.	Interactive lecture + video projector / Online	2
Bibliography		

1. Marin Tomşe – Sisteme de conversie și utilizare a energiei electrice. https://prof.uoradea.ro/mtomse 2. Victor Dragan, Victor Buchiu - Energiile regenerabile si utilizarea acestora, Editura Ceres, București, 2012. 3 Nicu Bizon – Sisteme optimizate pentru conversia energiei curate, Editura Matrix Rom, București, 2018. 4. Vatra Fanica, ș.a. - Integrarea si functionarea centralelor eoliene si a instalatiilor fotovoltaice in sistemul electroenergetic, Editura S.I.E.R., București, 2012, 5. Site-uri Internet cu informație specifică surselor de energie regenerabile și a convertoarelor de putere.

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

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

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

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1. The level and quality of acquired knowledge reflected in the answers to the exam. 2. Activity during the semester + course reports	Written exam / Online assessment (Online questionnaire)	80% 20% 20% of the mark for the laboratory is awarded for the successful completion of the individual study topic
10.5 Academic seminar			-
10.6 Laboratory			
10.7 Project			
10.8 Minimum performance standard: Course - Requirements for grade 5 :: Knowledge of the topologies and operating principles of electronic power converters for the conversion of solar and wind energy into electricity. Ability to analyze an electronic power structure in parallel with the related waveforms; Knowledge of the position of electronic power converters in various controlled processes or systems.			

Completion date
02.09.2024

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

Date of endorsement in the department:
10.09.2024

Signature of the department director
Ș:L.dr.ing. Burcă Adrian
9aburca@uoradea.ro

Date of endorsement in the department:
09.09.2024

Signature of the department director
Ș. L. Mircea Arion
e-mail: marion@uoradea.ro

Date of endorsement in the Faculty Board:
10.09.2024

Signature of the Dean
Conf.dr.ing. Gergely Eugen
e-mail: egergely@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	Master (2nd cycle)
1.6 Study program/Qualification	Advanced systems in electrical engineering / Master degree

2. Data related to the subject

2.1 Name of the subject				COMPUTERISED ELECTRICAL EQUIPMENTS			
2.2 Holder of the subject				Popa Monica			
2.3 Holder of the academic seminar/laboratory/project				Popa Monica			
2.4 Year of study	II	2.5 Semester	III	2.6 Type of the evaluation	Ex	2.7 Subject regime	I

(I) Imposed; (O) Optional;

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

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	4
Examinations	3
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Electrical installations, Electrical devices
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 laboratory	on-site Computers and software packages, intelligent relays

6. Specific skills acquired	
Professional skills	**C2** Use of modern acquisition techniques, data processing and their use in complex equipment systems in electrical engineering **C3** Analysis and development of applications for optimizing industrial processes of electrical engineering using specific software
Transversal skills	

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

7.1 The general objective of the subject	▪ Integration of intelligent equipments in electrical installations
7.2 Specific objectives	▪ Programing of intelligent equipments ▪ Choosing the intelligent equipments and their integration in complex installations

8. Contents *

8.1 Course	Teaching methods	No. of hours/ Observations
1. Basics of programmable equipments	notes on blackboard, Power Point presentation	2
2. Fundamentals of programming in ladder language. Ladder diagrams	notes on blackboard, Power Point presentation	2
3. FBD language(functional block diagram). Developing of complex applications.	notes on blackboard, Power Point presentation	2
4. Intelligent relays – basics and their programming	notes on blackboard, Power Point presentation	2
5. Applications of AP in electrical installations. Communication betwwens comutation equipments HMI (human machine interface)	notes on blackboard, Power Point presentation	2
6. Principles and local area networks technologies. LAN standards.	notes on blackboard, Power Point presentation	2
7. Wireless technologies in electrical installations..	notes on blackboard, Power Point presentation	2

Bibliografie 1. Monica Popa – Course notes, **https://e.uoradea.ro/course/** 2. Shengwei Wang – Intelligent buildings and building automation, Spoon Press New York 2010 3. Equipments user guide 4. Web resources		
8.3 Laboratory	Teaching methods	No. of hours/ Observations
L1, L2 – Ladder language presentation and the intelligent equipments in the laboratory	assisting the students in solving applications on computer	4
L3 – AAR – two or three sources	assisting the students in solving applications on computer	2
L4 – Applications in lighting control	assisting the students in solving applications on computer	2
L5 – The temperature and ventilation control in a green house	assisting the students in solving applications on computer	2
L6 – Monitoring the access in a car parking	assisting the students in solving applications on computer	2
L7 – Control of a tank systems	assisting the students in solving applications on computer	2
L8 – Control of a pumping group	assisting the students in solving applications on computer	2
L9 – Control af three transportors belts	assisting the students in solving applications on computer	2
L10 – Cotrol of an irrigation system	assisting the students in solving applications on computer	2
L11- Control af a feeding system in a pharm	assisting the students in solving applications on computer	2
L12 – Control of a mixing system	assisting the students in solving applications on computer	2
L13 – Remote control of a pumping station	assisting the students in solving applications on computer	2
L14 – Evaluation of laboratory activity	final verification of applications	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 solve a CAD	Oral examination	80%

	application	Application on computer	
10.5 Laboratory	Solving the tasks	Activity at laboratory classes	20%
10.6 Minimum performance standard:			
Passing the subject - grade ≥ 5.			

Completion date: | Signature of subject holder | Signature of academic laboratory holder

2.09.2024 | Assoc. Prof. Monica Popa
e-mail: mpopa@uoradea.ro | Assoc. Prof. Monica Popa

Date of endorsement in the department: | Signature of Department Head

9.09.2024 | Lecturer. Mircea Nicolae Arion
e-mail: marion@uoradea.ro

Date of endorsement in the Faculty Board: | Signature of Dean

10.09.2024 | Assoc. Prof. Gergely Eugen Ioan
e-mail: egergely@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	Master
1.6 Study program/Qualification	Advanced systems in electrical engineering

2. Data related to the subject

2.1 Name of the subject				OPTIMIZATION IN ELECTRICAL ENGINEERING - PROJECT			
2.2 Holder of the subject				Popa Monica			
2.3 Holder of the academic seminar/laboratory/project				Popa Monica			
2.4 Year of study	II	2.5 Semester	III	2.6 Type of the evaluation	PR	2.7 Subject regime	I

(I) Imposed; (O) Optional;

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

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

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	4
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	2
Examinations	2
Other activities.	

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

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Computer aided design
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 laboratory	on-site Computers and software packages Matlab, Flux

6. Specific skills acquired	
Professional skills	C3. Analysis and development of applications for optimizing industrial processes of electrical engineering using specific software C6. Developing leadership skills of specific projects in electrical engineering

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

7.1 The general objective of the subject	▪ Knowledge of optimization methods applied in electrical engineering and their use in improving the efficiency of electrical devices
7.2 Specific objectives	▪ Identification and proper formulation of an optimization problem in electrical engineering ▪ Ability to develop algorithms for optimal design ▪ Learning of using specific software packages. ▪ Implementation of an optimal design application

8. Contents *

8.2 Project	Teaching methods	No. of hours/ Observations
Transposing the electrical engineering problems in optimal synthesis problems	Power Point presentation	2
Introductive notions - Matlab Optimization Toolbox	Power Point presentation	2
Solving optimization problems. Using the functions – *fminbnd, fminunc, fminsearch, linprog, fmincon*	computer application	4
Application - optimal problem for the synthesis of a coil	computer application	2
Application - optimal problem for the synthesis of a transverse flux inductor	computer application	4
Presentation of the project subject – optimization of efficiency for an induction heating application	discussions	2
Implementation of the optimization problem	assisting the students in developing the application	10
Results interpretation	discussions	2

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2. Monica Popa – Bazele proiectarii asistate. Metode de optimizare, Editura Universitatii din Oradea 2003
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11. G. Ciuprina – Studiul câmpului electromagnetic în medii neliniare. Contribuții privind optimizarea dispozitivelor electromagnetice neliniare, teză de doctorat, Universitatea Politehnica București, 1998
12. Monica Popa – Contribuții privind modelarea numerică a încălzirii în flux magnetic transversal, teză de doctorat, Universitatea din Oradea, 2001
13. Sorin Pașca – Contribuții privind modelarea numerică a proceselor electrotermice din cuptorul de inducţie cu creuzet, teză de doctorat, Universitatea din Oradea, 2004
14. Matlab Optimization Toolbox – User guide, documentation

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

- The content of the 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 face to face or on-line	10.3 Percent from the final mark
10.5 Project	Solving the tasks	Activity at project classes	100%
10.6 Minimum performance standard:			
Passing the subject - grade ≥ 5.			

Completion date: 2.09.2024

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: 9.09.2024

Signature of Department Head

Lecturer. Mircea Nicolae Arion
e-mail: marion@uoradea.ro

Date of endorsement in the Faculty Board: 10.09.2024

Signature of Dean

Assoc. Prof. Gergely Eugen Ioan
e-mail: egergely@uoradea.ro