



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name	Physics III - Electrotechnics						
2.2 Course Activities Holder	Prof. dr. ing. Lucian MANDACHE						
2.3. Practical Activities Holder	Ș.l. dr. ing. Ioana-Gabriela SÎRBU Ș.l. dr. ing. Dan-Gabriel STĂNESCU						
2.4. Study Year	1	2.5. Semester	2	2.6. Evaluation type	E	2.7. Discipline regime	DOB

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	4	in which: 3.2 course	2	3.3. sem./lab./pr.	2
3.4. Total hours of curriculum	56	in which: 3.5 course	28	3.6. sem./lab./pr.	28
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					21
Additional documentation in library, on specialized electronic platforms and field					21
Training seminars / labs, homework, portfolios and essays					21
Tutorial					-
Examinations					3
Other activities.....					3
Total hours per individual activities					69
3.8. Total hours per semester					125
3.9. Number of credits					5

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	Students must possess fundamental knowledge acquired in the disciplines: Linear Algebra, Analytical and Differential Geometry; Mathematical Analysis; Physics; Special Mathematics.
4.2. of competence	Not necessary

5. CONDITIONS (where appropriate)

5.1. of the course	The course is taught in the classic system, on the board, or using a computer and video projector. The explanations are accompanied by reasoning based on mathematical support and applied examples. In the case of online activity, teaching is carried out through the Google Classroom e-learning platform, with audio-video interaction through the Google Meet platform. Course support in electronic format and access to bibliographic references existing in the university library are provided. Reference document: The methodology for carrying out activities conducted at UCv in the online system
5.2. of seminar/ laboratory/project	Seminar: In the seminar classes, applied topics inspired by engineering practice are treated, whose solving involves applying the theoretical notions taught in the course. The problems are solved interactively, with the students' participation both through answers from their seats and with presentation at the board. In the case of online activity, the Google Classroom platform is used for document transfer and written communication, and Google Meet for audio-video interaction. Laboratory: The laboratory consists in building assemblies, powering them up and recording the qualitative and quantitative observations. Work is carried out only at low voltage, under strict compliance with labour protection and fire safety rules. Students have written support available in the form of laboratory platforms. In the case of online activity, the Google Classroom platform is used for document transfer and written communication, and Google Meet for audio-video interaction. In this situation, the laboratory works are studied through numerical simulations that reproduce the conditions of the physical laboratory, using the LTspice circuit simulator and a user guide adapted to online interaction, as well as demonstration videos. The input data of the simulations are individualized for each student. Based on the results obtained, students prepare laboratory reports which they submit through Google Classroom.

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate: Describes, identifies and summarizes elementary concepts and methods regarding systems in general and digital systems and computer networks in particular, and the way they are applied to concrete problems.
Skills (Abilities)	The student/graduate uses specific methods for measuring electrical quantities and identifies digital and analog electronic devices. The student/graduate analyzes systems using the studied theories and designs, implements, diagnoses and debugs digital systems. The student/graduate uses specific theories and tools (applications, models, protocols etc.) for the analysis, simulation, design and implementation of computer networks.

Responsibility and autonomy	The student/graduate conducts processes in the management of computers and information technology projects, taking over different roles in the team and describing the results clearly and concisely, verbally and in writing.
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7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. Fundamental notions regarding electromagnetic phenomena - Generalities on the Maxwell-Hertz macroscopic theory - Specific quantities and units of measurement - Regimes of electromagnetic phenomena		According to point 5.1	2
2. General notions of electromagnetic field theory - The general laws of the Maxwell-Hertz theory, with reference to specific applications - The material laws of the Maxwell-Hertz theory, with reference to specific applications - The resistor, the coil, the capacitor, the ideal transformer. Construction and operating principles		According to point 5.1	4
3. Fundamental notions of electric circuit theory			0
3.1. Linear circuits in stationary regime - Kirchhoff's theorems in direct current - Powers. Efficiency. The maximum power transfer theorem - The power conservation theorem in isolated circuits - Equivalent circuits and electrical transfigurations - The superposition theorem. The reciprocity theorem - The equivalent generator theorems - Calculation methods for DC circuits. The power balance - Nonlinear circuit elements. Particularities of nonlinear circuits and specific calculation methods.		According to point 5.1	6
3.2. Sinusoidal alternating current electric circuits - Sinusoidal quantities. Representation in the complex domain - The passive dipole in sinusoidal regime. Circuit elements in sinusoidal regime - Powers in sinusoidal regime - Power		According to point 5.1	6

conservation theorems - Electrical transfigurations in AC circuits - Electrical resonance. Resonant circuits - Complex-domain calculation methods for AC circuits - Circuits with mutual couplings			
3.3. Electric circuits in transient regime - Initial conditions. Continuity theorems - The direct integration method: the response to step excitations; the response to pulses; the response of circuits to sinusoidal excitations - Operational methods for analyzing transient regimes		According to point 5.1	6
3.4. Two-port networks and electric filters - The equations and parameters of two-port networks - Interconnecting two-port networks - A matched chain of symmetric two-port networks - Frequency characteristics. Classifications of electric filters - Determining the cutoff frequencies		According to point 5.1	2
3.5. Three-phase electric circuits - Three-phase systems of sinusoidal quantities - The connections of three-phase circuit elements - Calculation of balanced symmetric three-phase circuits - Notions on the calculation of unbalanced three-phase circuits		According to point 5.1	2
Bibliography:			
1. L. Mandache, Electrotehnica, suport de curs pentru specializarea Calculatoare, format electronic, versiune actualizată 2020-2021, disponibilă în platforma Google Classroom și în aplicația Evidenta studenților UCv: https://cis01.ucv.ro/evstud/ 2. L. Mandache, D. Topan, Simularea circuitelor electrice, Ed. Universitaria, Craiova 2009 3. M. Badea, L. Mandache, Éléments d'électrodynamique, Editura AIUS, Craiova, 2004 4. M. Badea, L. Mandache, Leçons sur l'analyse et la synthèse des circuits électriques, Vol. I, Editura AIUS, Craiova, 2000 5. Preda, M., Cristea, P., Bazele electrotehnicii, vol. 1, 2, EDP, 1980 6. Iordache, M., Dumitriu, Lucia, Teoria circuitelor electrice, Editura Matrix Rom, 2007 7. Topan, D., Mandache, L., Metode de analiza in circuite electrice complexe, Editura Universitaria, 2002			

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. Seminar			0
Laws of the Maxwell-Hertz theory. Applications		According to point 5.2	4
Linear electric circuits in direct current regime. Applications		According to point 5.2	2
Electric circuits in sinusoidal		According to point 5.2	4

alternating current regime. Particularizations for three-phase circuits. Applications			
Electric circuits in transient regime. Applications		According to point 5.2	4
2. Laboratory			0
General presentation of the laboratory and labour protection training in the Fundamentals of Electrotechnics laboratory.		According to point 5.2	2
Experimental study of specific theorems in DC circuits		According to point 5.2	2
Experimental study of circuits with nonlinear resistors		According to point 5.2	2
Experimental study of the series RLC circuit in sinusoidal alternating current		According to point 5.2	2
Experimental study of transient regimes in series RC and RLC circuits		According to point 5.2	2
Experimental determination of impedances		According to point 5.2	2
Experimental study of linear passive two-port networks		According to point 5.2	2
Bibliography:			
1. L. Mandache, I.G. Sîrbu, M.S. Nicolae, Probleme rezolvate de electrotehnică – suport de seminar pentru domeniul ingineriei sistemelor, pentru studenții Facultății de Automatică, versiune actualizată 2020-2021, disponibil în platforma Google Classroom 2. L. Mandache, I.G. Sîrbu, Ghid rapid de utilizare a simulatorului de circuite LTspice, 2020 3. L. Mandache și colectiv, Bazele electrotehnicii – îndrumar de laborator, format electronic, 2019 4. M. Preda ș.a., Bazele electrotehnicii - Probleme, EDP, 1984 5. Radulet, R, Bazele electrotehnicii - Probleme, I-II, EDP, 1970			

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

The course content was adapted following consultation with the holders of the domain and specialty disciplines, as well as with the representatives of economic agents: SC IPA SA, FORD, Continental Romania, HELLA Romania, QFORT, ICMET Craiova, Cummins Generators Romania, Indaeltrac Craiova.

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	- Understanding electromagnetic phenomena from a qualitative point of view, the operation of electric circuits and the ability to perform quantitative	Written exam with 3 proposed subjects. In the case of online activity, the exam takes place with audio-video interaction and document transfer through Google	40%

	evaluations. - The capacity for synthesis	Classroom and Meet. Students simultaneously receive individualized theoretical subjects randomly chosen from the list of	
9.5. Seminar/laboratory/project	S: - The ability to apply the theoretical knowledge to solve problems of practical interest.	In the case of online activity, the exam takes place with audio-video interaction and document transfer through Google Classroom and Meet. Students simultaneously receive individualized applied subjects of the type covered in the seminar and proposed as homework; the response time is limited. The subjects are solved by hand, the answers are photographed and sent to the teacher using the dedicated platform. The grading scale is communicated to the students. The weight of the subjects proposed in the exam is 20% of the final grade. A homework assignment containing proposed problems with a response time of at least 14 days. The weight of the homework is 10% of the final grade. Reference document: The methodology for carrying out activities conducted at UCv in the online system	30%

9.6. Minimum standard of performance
Obtaining at least 50% of the score of the assessments and the exam. The final grade is calculated by rounding the final score to a whole grade.

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	Prof. dr. ing. Lucian MANDACHE	Ș.l. dr. ing. Ioana-Gabriela SÎRBU Ș.l. dr. ing. Dan-Gabriel STĂNESCU

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ȘENDRESCU