SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Electrical Engineering
1.3	Department	Electrotechnics and Measurements
1.4	Field of study	Electrical Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/ Qualification	Electrical System Cluj-Napoca in English language
1.7	Form of education	Full time
1.8	Subject code	14.00

2. Data about the subject

2.1	Subject name				Elecrical Circuits Theory	
2.2	Course responsible/ lecturer				Prof. Dr. Ing. Denisa ȘTEȚ – denisa.stet@ethm.utcluj.ro	
2.3	Teachers in charge of Seminars/ Laboratory/ Project				Sl. Dr. Ing Adrian Bojiță – adrian.bojita@ethm.utcluj.ro	
2.4 Year of study	1	E	2		2.6 Type of assessment *(E – exam, C – colloquium, V – verification)*	E
2.7 Subject category	*DF – fundamental, DD – in the field, DS – specialty, DC – complementary*					DD
	DI – compulsory, DO – elective, Dfac – optional					DI

3. Estimated total time

3.1 Number of hours per week:	4	of which	3.2 Course	2	3.3 Seminar	2	3.3 Laboratory	-	3.3 Project	-
3.2 Total hours per semester	56	of which	3.5 Course	28	3.6 Seminar	2	3.6 Laboratory	-	3.6 Project	-

3.7 Individual study:	
(a) Manual, lecture material and notes, bibliography	20
(b) Supplementary study in the library, online and in the field	20
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	20
(d) Tutoring	5
(e) Exams and tests	4
(f) Other activities	-

3.8 Total hours of individual study *[sum (3.7(a) to 3.7(f))]*	69
3.9 Total hours per semester *[sum of 3.4 and 3.8]*	125
3.10 Number of credit points	5

4. Prerequisites (where applicable)

4.1	Curriculum	Mathematical Analysis, Linear Algebra, Special Mathematics
4.2	Competences	Fundamental knowledge of mathematics and physics

5. Requirements (where appropriate)

5.1	For the course	Attendance on the course is mandatory (50% of the number of courses)
5.2	For the applications	Prezența la seminar nu este obligatorie

6. Specific competences

Professional competences	• Ability to identify, formulate, and solve engineering problems in a systemic approach • Ability to address and manage specific general electrical engineering applications • The ability to approach and solve problems of the theory of electrical circuits through methods and procedures specific to electrotechnics • Ability to know the particularities of DC and AC electrical circuits • The ability to apply in practice the fundamental theorems of electrical circuits • Ability to determine current circulation, voltage drops or perform power balances in specific electrical circuit applications.
Cross competences	• Flexibility in approaching and using in practice the latest existing technologies in the areas of competence assumed • Ability to work in a team • Flexibility to use the knowledge acquired in previous subjects • Flexibility to apply the knowledge acquired to the specialized subjects of the following years

7. Expected learning outcomes

Knowledge	The student/graduate identifies, formulates, analyzes the principles of electricity circuits and the risks associated with them
Abilities	The student/graduate discovers defects in the electrical circuits and can repair them. The student/graduate explains the wiring diagrams that show the connections between the devices, such as electrical and signal connections. The student/graduate develops analog and digital, electrical and electronic circuits, systems and products.
Responsibility and autonomy	The student/graduate selects and uses bibliographic sources specific to the field. The student/graduate demonstrates autonomy in learning specific engineering issues.

8. Discipline objectives (based on specific competencies acquired)

7.1	General objective	Acquisition of fundamental theoretical and applied knowledge regarding the study of direct current and alternating current electrical circuits, in different operating regimes.
7.2	Specific objectives	• Capacitatea de a aborda probleme specifice de circuite electrice de curent continuu • Capacitatea de a aborda probleme specifice de circuite electrice de curent alternativ monofazat • Capacitatea de a utiliza in aplicații practice teoremele fundamentale ale circuitelor electrice

9. Contents

9.1. Course (Lectures)		Number of hours	Teaching methods	Additional remarks
1	Circuite electrice trifazate. Introducere	2	The course is taught on the board, in the	
2	Three-phase circuit connections	2		

3	Solving three-phase circuits. Power in three-phase circuits	2	classic way, providing students with the necessary details to understand the aspects presented. In addition, in certain parts of the course, multimedia facilities are used.	
4	Symmetrical Components Method for Three-Phase Circuits	2		
5	Two -port networks. Introduction	2		
6	Equivalent schemes of the two -port networks.	2		
7	Conexions of the two -port networks.	2		
8	Simetrical two -port networks. Electric frequency filters	2		
9	Non-sinusoidal regime in electrical circuits. Introduction	2		
10	Power in non-sinusoidal regime. Solving electrical circuits in non-sinusoidal mode	2		
11	Transient regime in electrical circuits. Introduction	2		
12	Simple circuits of the first order in transient regime. Interpreting the Time Constant	2		
13	The Laplace transform method for solving transient regime problems	2		
14	Duhamel integral method for solving transient regime problems	2		

Bibliography

1. E. Simion, T. Maghiar, Electrotehnica, EDP București, 1981
2. C. Sora, Bazele electrotehnicii, EDP București, 1982
3. C. Mocanu, Teoria câmpului electromagnetic, EDP București, 1981
4. M Iordache, L. Dumitriu, Teoria moderna a circuitelor electrice, Ed. All Educational, 2000
5. Gh. Mindru, Teoria circuitelor electrice, Ed. UTPRESS Cluj-Napoca, 2004
6. Ch. K. Alexander, M.N.O. Sadiku, "Fundamentals of Electric Circuits", Eg. Mc Graw Hill, 2012

9.2. Applications - Seminar		Number of hours	Teaching methods	Additional remarks
1	Solving problems with three-phase electrical circuits	2	Seminar applications are carried out by solving problems specific to course chapters, with the active involvement of students.	
2	Three-phase circuit connections – Y-D transfigurations	2		
3	Solving three-phase circuits. Power in three-phase circuits	2		
4	Symmetrical Components Method for Three-Phase Circuits	2		
5	Two port network equations	2		
6	Equivalent schemes of the two-port networks	2		
7	Degenerate two-port networks	2		
8	Electric frequency filters	2		
9	Solving electrical circuits in non-sinusoidal regime	2		
10	Solving electrical circuits in non-sinusoidal regime	2		
11	Solving circuits in transient regime	2		
12	Solving circuits in transient regime	2		
13	Solving circuits in transient regime - Laplace transform method	2		
14	Solving circuits in transient regime - Duhamel method	2		

Bibliography

1. D. Micu, L. Darabant, D. Stet sa, “Teoria circuitelor electrice. Probleme, Ed. UTPress, 2016.
2. M. Preda, P. Cristea, F. Manea, Bazele electrotehnicii – probleme, EDP București, 1980
3. R. Răduleț, Bazele electrotehnicii – probleme, EDP București, 1981

10. Alignment of course content with expectations of the epistemic community, professional associations, and representative employers in the field

The course presents the fundamental methods and theorems for solving problems of electrical circuits. Thus, its purpose is to constitute itself as part of the necessary basis for the further development of specialized disciplines.

11. Assessment

Activity type	11.1 Assessment criteria	11.2 Assessment methods	11.3 Weight in the final grade (%)
11.4 Course	Assesment of the theoretical knowledge	Written exam	50 %
11.5 Seminar	Practical knowledge check	Written exam	50%
11.5 Project			
11.6 Minimum standard of performance: Understanding of basic concepts and terminology; Problem solving.			

Date of completion	Lecturers	Title/ Surname/ Name:	Signature
September 2025	Course	Prof. Dr. Ing. Denisa Stet	
	Applications Seminar/ Laboratory/ Project	Sl Dr. Ing. Adrian Bojita	

Date of approval in the ETHM Department Council

January 2026

Head of Department:
Prof. Eng. MICU Dan Doru, PhD

Date of approval in the Faculty of Electrical Engineering Council

February 2026

Dean:
Assoc. Prof. Eng. CZIKER Andrei, PhD