SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Electrotechnics and Measurements
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of study	Bachelor of Science
1.6 Program of study / Qualification	Telecommunications Technologies and Systems/ Engineer Applied Electronics/Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E13.00/EA-E13.00

2. Data about the subject

2.1 Subject name	Bases of Electrotechnics I						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3 Course responsible	Assoc. Prof. Denisa STET – Denisa.Stet@ethm.utcluj.ro						
2.4 Teacher in charge with seminar / laboratory / project	Assoc. Prof. Denisa STET – Denisa.Stet@ethm.utcluj.ro						
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

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

Distribution of time	hours
Manual, lecture material and notes, bibliography	24
Supplementary study in the library, online specialized platforms and in the field	-
Preparation for seminars / laboratories, homework, reports, portfolios and essays	14
Tutoring	3
Exams and tests	3
Other activities:	-

3.7 Total hours of individual study	44
3.8 Total hours per semester	100
3.9 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 curriculum	N / A
4.2 competence	Relations and theorems for electric circuits; analysis methods for electric circuits; transfer function

5. Requirements (where appropriate)

5.1. for the course	Amphitheatre, Cluj-Napoca
5.2. for the seminars / laboratories / projects	Classroom, Cluj-Napoca

6. Specific competences

Professional competences	C1. Use of the fundamental elements related to devices, circuits, systems, instrumentation and electronic technology C4. Design, implementation and operation of data, voice, video and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks
Transversal competences	N/A

7. Discipline objectives (as results from the key competences gained)

7.1 General objective	On successful completion of this course, students will be able to: analyze the operation of linear circuits in response to DC, sinusoidal, non-sinusoidal and transient waveforms.
7.2 Specific objectives	- To present systematically the basic theory of the electric circuits -To introduce electrical components and the fundamental laws that govern the behavior of an electrical circuit in case of: 1) DC and AC circuits; 2) two-ports networks; 3) steady-state periodic non-sinusoidal regime; 4) transient regime of linear circuits; 5) three-phase circuits; 5) transmission lines.

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction to the circuit theory. lines	Presentation, exemplification, solving problems, teaching exercise, case study, evaluation	Use of power point presentation, projector, blackboard
2. Direct current circuits (Kirchhoff theorems, ideal sources, node analysis, loop analysis, Thevenin and Norton equivalent generator)		
3. Linear electric circuits in the sinusoidal steady state.		
4. Symbolic representation of sinusoidal quantities, linear complex electric circuits equations		
5. Equivalent impedances		
6. Power, conservation of complex power, energy transfer		
7. Resonance in electric circuits (series, parallel, real, inductively coupled circuits)		
8. Methods and theorems for the analysis of the a.c. circuits (elements of topology and graph theory, transfiguration methods).		

9. Two-port networks (the physical significance of the parameters, connections, equations, equivalent circuit diagrams)		
10. Three-phased electric circuits		
11. Non-sinusoidal steady state		
12. The transient regime of the linear electric circuits (continuity conditions, first order circuits, second order circuits).		
13. The transient regime of the linear electric circuits (Laplace transform, Fourier transform, state equations).		
14. Transmission lines		
Bibliography [1] Ch. K. Alexander, M.N.O. Sadiku, "Fundamentals of Electric Circuits", Eg. Mc Graw Hill, 2012; [2] R.C. Dorf, J.A. Svoboda, "Introduction in Electric Circuits", Ed. Johm Wiley & Sons, Inc., 1996; [3] RV Ciupa, V Topa,The Theory of Electric Circuits, Ed. Casa Cartii de Stiinta Publishing House, 2003; [4] RV Ciupa, Bazele electrotehnicii. Teorie și aplicații. (vol.1-157 pag., vol.2 -277 pag.), Ed. Casa Cărții de Știință Cluj-Napoca.		
8.2 Seminar / laboratory / project	Teaching methods	Notes
1. Methods of solving D.C. circuits (equivalent resistances, Kirchhoff's laws, Ohm's law, superposition theorem, the method of loop currents),	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, white/magnetic board
2. Methods of solving D.C. circuits (the method of node-voltages, maximum power transfer, Thevenin and Norton equivalent network theorems)		
3. Mathematical operations with sinusoidal quantities. Representation of sinusoidal functions by vectors and complex number. The phase diagrams		
4. Method of solving A.C. circuits using phase diagrams		
5. Method of solving A.C. circuits (equivalent impedances, Kirchhoff' s current and voltage laws)		
6. Method of solving A.C. circuits (method of loop currents, method of node-voltage		
7. Method of solving A.C. circuits (Thevenin and Norton equivalent network theorems, the conservation of complex power)		
8. Resonance in electrical circuits		
9. Two – port networks – finding the ABCD, impedance and admittance parameters		
10. Two – port networks – equivalent T and Π networks, the interconnection of twoport networks		
11. Steady –state periodic non-sinusoidal regime – finding the coefficients of the Fourier series		
12. Network analysis in non-sinusoidal regime (resonance, power balance for nonsinusoidal periodic variables)		
13. Transmission lines (determination of primary and secondary line parameters, voltage and current waves on long lines)		
14. Review of the methods and theorems		
Bibliography		

[1] Ch. K. Alexander, M.N.O. Sadiku, "Fundamentals of Electric Circuits", Eg. Mc Graw Hill, 2012;
[2] D. Micu, L. Darabant, D. stet sa, "Teoria circuitelor electrice. Probleme, Ed. UTPress, 2016.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The discipline content and the acquired skills are in agreement with the expectations of the professional Competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The level of acquired theoretical knowledge and practical skills	Written examination	100%
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities		
10.6 Minimum standard of performance			
To know the fundamental laws that govern the behavior of an electrical circuit in case of: 1) DC and AC circuits; 2) two-ports networks; 3) steady-state periodic non-sinusoidal regime; 4) transient regime of linear circuits; 5) three-phase circuits; 5) transmission lines.			

Date of filling in:	**Responsible**	**Title First name SURNAME**	**Signature**
16.06.2025	Course	Assoc. Prof. Denisa STET	
	Applications	Assoc. Prof. Denisa STET	

Date of approval in the Council of the Communications Department 18.06.2025	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 25.06.2025	Dean Prof. Ovidiu POP, Ph.D.