SYLLABUS

Discipline name	Theory of Electric Circuits
Profile	Electronics and Telecommunications Engineering
Specialization	Telecommunications Technologies and Systems (English)
Code	51321409
Course leader	Professor Radu V. CIUPA, Ph.D., radu.ciupa@et.utcluj.ro
Collaborators	Assistant Denisa DUMA, Denisa.Duma@et.utcluj.ro
Department	Electrotechnics
Faculty	Electrical Engineering

Sem.	Type of discipline	Course	Aplications			Course	Aplications			Ind. study	TOTAL	Credits	Form of assessment
		[hours/week]				[hours/sem.]							
			S	L	P		S	L	P				
2	**Engineering**	**2**	**2**	**-**	**-**	**28**	**28**	**-**	**-**	**64**	**120**	**4**	**Exam**

Acquired competences
Knowledge / understanding:
• To enable the student to solve various types of theoretical problems using methods and theorems • To enable the student to analyze and study electronic circuits by means of quadripoles. • To convince students that their understanding of many areas, such as solid state, physical electronics, microwaves, etc. depends on EM
Intellectual skills:
• This course should stimulate students' interest, for they often tend to view a course in EM as a dry experience which does not go beyond mathematical manipulations.
Practical skills:
• The more logical presentation of the traditional approach can be made sufficiently exciting to engineering students by relating the theory to real-world problems which are covered in the application sections

Pre-requisites:
Mathematics I, II; Physics

A. Course content:	
1	Introduction to the circuit theory.
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 (physical significance of the parameters, connections, equations, equivalent 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

B1. Applications – **Laboratory** (list of laboratories), **Seminar** (contents), **Project** (project contents)	
1	Basic knowledge about electric circuits
2	Methods -direct current circuits
3	Linear electric circuits in the sinusoidal steady state.
4	Symbolic representation of sinusoidal quantities
5	Equivalent impedances 1
6	Equivalent impedances 2
7	Resonance in electric circuits (series, parallel)
8	Resonance in electric circuits (real, inductively coupled circuits)
9	Methods and theorems for the analysis of the a.c. circuits 1

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10	Methods and theorems for the analysis of the a.c. circuits 2
11	Methods and theorems for the analysis of the a.c. circuits 3
12	Non-sinusoidal regime
13	The transient regime of the linear electric circuits 1
14	The transient regime of the linear electric circuits 2

C. Individual study (reference study contents, synthesis materials, projects, applications etc.)

1. Various types of theoretical problems using methods and theorems (sythesis material)

Individual study structure	Course study	Problem solving, laboratory,	Applications preparation	Examination time	Additional reference study	Total no. of individual study hours
Hours	28	8	16	2	10	64

D. Aims

- to provide a grounding in the electrical circuits theory
- to present the fundamental notions necessary in the study of an a.c. circuit

References (Textbooks, courses, laboratory manual, exercise book)

1. The Theory of Electric Circuits, authors: RV Ciupa, V Topa, Casa Cartii de Stiinta Publishing House, 2003

Assessment	
Evaluation method	1. Two hours written examination (70%); 2. Continuous assessment: a) seminar (30%)
Mark components	Examen (nota E); Seminar (nota S);
Mark computation	N=0,7E+0,3S Pass if: N≥5; S≥5;

Course leader,
Professor Radu V. CIUPA, Ph.D.