

SYLLABUS

Discipline name	Analysis and Synthesis of Circuits
Profile	Electronics and Telecommunications Engineering
Specialization	Telecommunications Technologies and Systems
Code	51322609
Course leader	Prof. Marina Țopa, Ph.D – Marina.Topa@bel.utcluj.ro , Assoc. Prof. Victor Popescu – Victor.Popescu@bel.utcluj.ro
Collaborators	Assistant Ioana Popescu – Ioana.Popescu@bel.utcluj.ro Assistant Erwin Szopos – Erwin.Szopos@bel.utcluj.ro Assistant Botond Sandor Kirei – Botond.Kirei@bel.utcluj.ro
Department	Basis of Electronics
Faculty	Electronics, Telecommunications and Information Technology

Sem.	Type of discipline	Course				Applications				Ind. study	TOTAL	Credits	Form of assessment
		[hours/week]				[hours/sem.]							
			S	L	P		S	L	P				
4	Engineering	2	1	1	-	28	14	14	-	94	150	5	Exam

Acquired competences :
Acquired skills (what the student is able to do): After completing the discipline, the students will be able to: - Work with topological graphs and matrices for circuit analysis; - Model a system with flowgraphs; - Set up the state equations for a circuit; - Analyze the stability of linear systems; - Design matching circuits, passive constant-k and derived filters, ladder passive filters.
Acquired abilities: (what type of equipment/instruments/software the student is able to handle) After completing the discipline, the students will be able to: - Use the OrCAD software for determining the frequency characteristics of a circuit, find its bands; - Model in OrCAD transmission lines.

Prerequisites (if necessary)
Knowledge about electric signals, spectrum frequency, transfer function, methods for circuit analysis, electronic devices.

A. Course/Lecture (course/lecture titles)	
1	Introduction. Topology of circuits.
2	Flowgraphs.
3	State variables space.
4	Stability analysis.
5	Criteria for stability analysis.
6	Description of electric circuits.
7	Passive one-ports.
8	Passive two-ports.
9	Impedance matching circuits. Simple circuits.
10	Impedance matching circuits. Rejection of frequencies.
11	Passive filters. Constant-k filters.
12	Passive filters. Derived filters.
13	Synthesis of circuits. Approximation and frequency transformation.
14	Synthesis of circuits. Ladder passive filters. Active filters.

B1. Applications – Laboratory (list of laboratories)	
1	Ist order systems.
2	LP and HP IInd order filters.
3	PB IInd order filters.
4	Dual circuits.
5	Elementary one-ports.
6	Waves propagation and matching.
7	Simple impedance matching circuits.

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B2. Applications –Seminar (contents)	
1	Topology. Graphs.
2	Stability.
3	State space.
4	Passive two-ports.
5	Impedance matching circuits.
6	Passive filters.
7	Circuits synthesis.

C. Individual study (reference study contents, synthesis materials, projects, applications etc.)						
7 sets of problems						
Individual study structure	Course study	Problem solving, laboratory, project	Applications preparation	Examination time	Additional reference study	Total no. of individual study hours
Hours	28	20	21	3	22	94

References (Textbooks, courses, laboratory manual, exercise book)
<ol style="list-style-type: none"> Victor POPESCU – <i>Semnale, Circuite și Sisteme, partea I</i>, Editura Casa Cărții de Știință, 2001 Marina Dana ȚOPA – <i>Semnale, Circuite și Sisteme, partea a II-a</i>, Editura Casa Cărții de Știință, 2002 Victor POPESCU – <i>Semnale, circuite și sisteme – III, Teoria circuitelor</i>. Casa Cărții de Știință, 2003 Adelaida MATEESCU ș.a. – <i>Semnale și Sisteme</i>, Editura Teora, 2001 Ioana POPESCU, Erwin SZOPOS, Victor POPESCU, Marina Dana ȚOPA – <i>Semnale, circuite și sisteme. Îndrumător de laborator IV</i>, Editura Casa Cărții de Știință, 2003. <p>On – line references http://193.226.5.66/scs/rom/asc_main.html</p>

Final evaluation	
Evaluation method	Tests at the courses, seminars, laboratories and a final written exam. The exam consists of questions on theory, multiple-choice questions and problems.
Mark components	A total number of 100 points (for the maximum mark 10) are distributed as follows: - 10p for the activity at the courses AC; - 15p for tests at the courses C; - 15p for seminar tests S; - 10p for the laboratory tests L; - 50p for the written exam E: 10p theory, 20p multiple-choice questions and 20p problems .
Mark computation	$M = (C+S+L+E)/10$ if $E > 20$

Course leader,

Prof. Marina ȚOPA, Ph.D.