



## SYLLABUS

### 1. Information about the program

1.1	Institute of Higher Education	Technical University of Cluj-Napoca
1.2	Faculty	Electronics, Telecommunications and Information Technology
1.3	Department	Applied Electronics
1.4	Study domain	Electronics and Telecommunications Engineering
1.5	Cycle studies	Bachelor of Science
1.6	Professional interest	Telecommunications Technologies and Systems/ Engineer, Applied Electronics/ Engineer
1.7	Form of learning	Full time
1.8	Discipline code	TST-E05.00, EA-E05.00

### 2. Information about the discipline

2.1	Name of the discipline		Passive electronic components and circuits								
2.2	Subject area		Electronic engineering and Telecommunications								
2.3	Lecturer		Assistant Professor Raul-Traian Fizeșan, PhD								
2.4	Discipline owner		Prof. Dan Pitică, PhD								
2.5	Year of study	I	2.6	Semester	1	2.7	Evaluation	Exam	2.8	Discipline regime	DD/ DI

### 3. The total estimated time

Year /Sem	Discipline type	No. weeks	Lecture			Applications			Ind. Study	Total	Credit
			[hours/weeks]			[hours/weeks]					
			S	L	P	S	L	P			
I/I	Passive electronic components and circuits	14	2	0	2	28	28	69	125	5	

3.1	Number of hours per week	4	3.2	lecture	2	3.3	applications	2
3.4	Total hours from curricula	56	3.5	lecture	28	3.6	applications	28
Individual study								Hours
Lecture materials study								23
Supplementary biographic study								10
Solving projects, home works, laboratories								26
Tutoring								7
Examinations								3
Other activities								-
3.7	Total hours of individual study	69						
3.8	Total hours per semester	125						
3.9	Number of credits	5						

### 4. Preconditions (where applicable)

4.1	Curriculum	
4.2	Skills	



**5. Conditions (where applicable)**

5.1	The development of the Lecture	Cluj-Napoca
5.2	The development of applications	Cluj-Napoca

**6. Specific obtained knowledge**

Professionally competent	Theoretical knowledge (What they need to know?)	To know the concepts of electronics products classification; To know to classify the electronics components; To know the basics of circuit analysis: laws and theorems for circuits analysis, characteristics and circuit's parameters, representation of electrical quantities on logarithmic scale; To know the passive circuits elements: resistance, capacitance, inductance; To know the passive electronic components: resistors, capacitors, inductors, quartz resonators, thermistors; To know the technological characteristics of the passive components; To know the main characteristics technologies for interconnection structures.
	Skills acquired (What they will know to do?)	The student will be able to: - Know the significance of passive components parameters; - Distinguish between physical component circuit element, between passive and active circuits, between linear and nonlinear circuits; - Identify the electronic components; - Use in applications the datasheet parameters of the passive components; - Determine (from datasheet or measurement) the properties of electronic components; - Do the analysis and design of simple circuits with passive components; - Interpret the results obtained in the analysis of circuits with passive electronic components. - Interpret the results obtained from measurements of circuits with passive electronic components.
	Practical knowledge (what equipment,	The student will be able to: - Make measurement operation with multimeters; - Use the signal generators, oscilloscopes, and supply voltages;
	In accordance with Grila1 and Grila2 RNCIS	C1 - To use the fundamental elements regarding electronic devices, circuits, systems, instrumentation and technology C4 - To design and use low complexity hardware and software applications, specific to applied electronics C6 - To solve technological problems, specific to applied electronics
Transversal competences		N.A.

**7. Discipline's targets (resulting from the grid with specific skills acquired)**

7.1	The overall objective of discipline	Developing skills in the passive electronic components and circuits domain.
7.2	Specific objectives	1.Assimilation of theoretical knowledge concerning the analysis and design of simple circuits with passive components; 2. Obtaining the skills for using the common measuring tools, signal generator, and oscilloscope.



**8. Contents**

8.1. Lecture (lecture's title +analytical scheduling)		Teaching methods	Observations
1	Introduction in passive electronic components and circuits.	Exposure, discussion	Projector
2	Basic concepts: The relationship between electronic component and circuit element. The topology of electronic circuits. Ohm's Law.		
3	Basic concepts: Electrical quantities. Logarithmic representation of the electrical quantities.		
4	Methods for analyzing electronic circuits.		
5	Resistance as a circuit element.		
6	The capacitance: DC and AC behavior.		
7	The capacitance: Transient behavior.		
8	The inductance: AC, DC and transient behavior.		
9	Resistors.		
10	Capacitors.		
11	Inductors.		
12	Modeling of electronic passive components.		
13	Modeling of interconnection elements using passive circuit elements.		
14	Nonlinear passive electronic components.		
8.2. Applications (seminar/laboratory/project)		Teaching methods	Observations
1	Introduction in PECC. Presentation of the equipment.	Exposure and applications	Computer, laboratory equipment
2	Ohm's law. Series and parallel connections.		
3	Voltage and current dividers		
4	Measuring the parameters of electrical quantities		
5	Applying Kirchhoff's voltage and current laws to analyze passive circuits		
6	Applying Superposition principle to analyze passive circuits		
7	Applying Thevenin's and Norton's theorems to analyze passive circuits		
8	Laboratory test		
9	RC and RL Circuits: AC behavior		
10	RC and RL Circuits: Time behavior		
11	RLC Circuits: AC behavior		
12	Using RLC circuits to measure the impedances		
13	Measuring the parameters of resistors		
14	Final laboratory test		
Bibliography			
1. Pitică Dan, Radu Mihaela - <i>Componente electronice pasive</i> , Litografia UTC-N, 1994			
2. Svasta Paul – <i>Componente și circuite pasive – Condensatoare</i> , Editura UPB,1997			
3. Svasta Paul – <i>Componente și circuite pasive – Rezistoare</i> , Editura UPB,2000			
4. Radu Mihaela – <i>Passive electronic components and structures</i> , Editura Casa Cărții de Știință, 2001			
<b>Virtual learning material</b>			
1. Pitică Dan, Passive electronic components and circuits, PowerPoint Presentations for lecture: <a href="http://www.ael.utcluj.ro/ORGANIZARE/curs&amp;tem_CCP.html">http://www.ael.utcluj.ro/ORGANIZARE/curs&amp;tem_CCP.html</a>			

**9. Bridging Course contents with the expectations of the epistemic community representatives, associations, and employers of the corresponding domain**

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).


**9. Evaluation**

Type of activity	10.1	Evaluation Criteria	10.2	Evaluation Methods	10.3	Share of final grade
Lecture		Theoretical knowledge, solving problems.		Written examination		50%
Applications		Practical results, interpretation of results		tests		50%
10.4 Minimum standard of performance						
Grade „5” to the two components mentioned in the „Evaluation Criteria”						

Completion Date  
1.10.18

Course responsible  
Prof. Dan Pitică, PhD

Teachers in charge of applications  
Assistant Professor Raul-Traian Fizeșan, PhD