



### SYLLABUS

#### 1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Eaculty	Faculty of Electronics, Telecommunications and information
1.2 Faculty	Technology
1.3 Department	Applied Electronics
1.4 Field of study	Electronic Engineering, Telecommunications and Information
1.4 Field Of Study	Technologies
1.5 Cycle of study	Bachelor of Science
1.6 Program of study / Qualification	Telecommunications Technologies and Systems/ Engineer
1.0 Program of study / Qualification	Applied Electronics/Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E28.00/EA-E28.00

#### 2. Data about the subject

2.1 Subject name		CAD T	CAD Techniques					
Theor		heoretical area						
2.2 Subject area Metho			lethodological area					
Analytic are			rea					
2.3 Course responsibl	e	Assist.Prof. Raul FIZESAN, Ph.D Raul.Fizesan@ael.utcluj.ro				<u>0</u>		
2.4 Teacher in charge	4 Teacher in charge with seminar / Assist.Prof. Raul FIZESAN, Ph.D <u>Raul.Fizesan@ael.utcluj.ro</u>				<u>c</u>			
laboratory / project								
2.5 Year of study	П	2.6 Semeste	r	4	2.7 Assessment	V	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	.4 To Total hours in the curriculum 100 of which: 3.5 course 28 3.6 seminar / lal		3.6 seminar / laboratory	28		
Distribution of time						
Manual, lecture material and notes, bibliography						
Supplementary study in the library, online specialized platforms and in the field						4
Preparation for seminars / laboratories, homework, reports, portfolios and essays						22
Tutoring						2
Exams and tests						2
Other activities:						
3.7 Total hours of individual study 44						
3.8 Total hours per semester 100						

## 4. Pre-requisites (where appropriate)

3.9 Number of credit points

4.1 curriculum	
4.2 competence	

4





#### **5. Requirements** (where appropriate)

5.1. for the course	
5.2. for the seminars / laboratories / projects	

#### 6. Specific competences

	C1. Use of the fundamental elements related to devices, circuits, systems, instrumentation
	and electronic technology
al	C2. Applying the basic methods for the acquisition and processing of signals
ion	C3. Application of the basic knowledge, concepts and methods regarding the architecture of
essi	computer systems, microprocessors, microcontrollers, languages and programming
ofe mp	techniques
<u>4</u> 8	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
S	N/A
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#### 7. Discipline objectives (as results from the key competences gained)

7.1 General objective	Development of skills in the field of simulation and modeling of electronic circuits
7.2 Specific objectives	<ol> <li>Assimilation of theoretical knowledge regarding the simulation of electronic circuits</li> <li>Obtaining skills for using electronic circuit simulation programs</li> </ol>

#### 8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction in circuit simulation techniques		
2. DC Analysis		
3. AC Analysis		
4. Time domain Analysis		
5. Parametric and Performance Analysis		
6. Statistical Analysis		
7. Behavioral modeling and hierarchical simulation	Exposition	
8. Standard simulation algorithms for electrical and electronic	discussions	Video projector
circuits	uiscussions	
9. Introduction in modeling of electronic devices		
10. Semiconductor diode modeling		
11. Modeling of bipolar transistor		
12. Modeling of JFET transistors		
13. Modeling of MOS transistors		
14. Modeling of operational amplifiers		
Bibliography		
1. Ovidiu Pop, Raul Fizeşan, Computer Aided Design. Editura U.T.	Press, Cluj-Napoca, 20	016.

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- 2. Ovidiu Pop, Proiectare asistata de calculator, Ed. Mediamira, Cluj-Napoca, 2007
- 3. Ana Rusu Proiectare asistata de calculator, Editura Dacia, Cluj, 1994
- 4. G.Chindris, A.Rusu-Proiectarea asistata de calculator a circuitelor electronice, Ed. Casa Cartii de Stiinta, 1999
- 5. G. Chindris, O. Pop, G.Deak-Simularea si modelarea avansata a circuitelor electronice, Ed. Casa Cartii de Stiinta, 2002

8.2 Laboratory	Teaching methods	Notes	
1. Introduction in PSPICE simulation			
2. DC Analysis			
3. AC Analysis			
4. Time Domain Analysis			
5. Parametric and Optimization Analysis			
6. Performance and Statistical Analysis			
7. Analog behavior modeling	Exposition,	Laboratory	
8. Modeling of systems with ABM circuits	discussions	platforms	
9. PSPICE modeling of semiconductor diodes			
10. PSPICE modeling of bipolar transistor			
11. PSPICE modeling of JFET and MOS transistors			
12. PSPICE modeling of sub-circuits			
13. PSPICE of modeling of operational amplifiers			
14. Evaluation			
Bibliography			
1. Raul Fizeşan, Ovidiu Pop, Gabriel Chindriş, Computer Aided Design: laboratory applications, Editura			
LLT Press Clui-Napoca 2015			

2. Ovidiu Pop, Raul Fizeşan, Gabriel Chindriş, Proiectare asistată de calculator: aplicații, Editura U.T. Press, Cluj-Napoca, 2013, ISBN 978-973-662-856-6

# 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 test	20%	
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	Practical test	80%	
10.6 Minimum standard of performance				





#### Quality level:

Minimum knowledge:

- ✓ Knowledge of methods of analysis of electronic circuits.
- ✓ Knowledge of the means of simulation and modeling of electronic circuits.
- ✓ Area Evaluation and interpretation of data obtained from electronic circuit simulation.

Minimum competences:

- ✓ Be able to identify the main types of analysis.
- ✓ To use standard simulation algorithms for electrical and electronic circuits.
- ✓ To perform the simulation of electronic circuits.
- $\checkmark$  To perform behavioral modeling and hierarchical simulation of a circuit
- ✓ To display and interpret the simulation results.
- ✓ To design electronic devices and circuits.

#### Quantitative level:

- ✓ Perform all laboratory work
- ✓ The exam and laboratory notes must be at least 5.
- ✓ The mark for the subject is calculated with the relation: 0.2 \* Exam score + 0.8 \* Laboratory score

Date of filling in:	Responsible	Title First name SURNAME	Signature
16.06.2025	Course	Assist. Prof. Raul FIZESAN, Ph.D.	
Applications Assist. Prof. R		Assist. Prof. Raul FIZESAN, Ph.D.	

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.