

## 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	Bases of Electronics
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-E15.00/EA-E15.00

### 2. Data about the subject

2.1 Subject name	Introduction in computer aided graphics						
2.2 Subject area	Theoretical area						
	Methodologic area						
	Analysis area						
2.3 Course responsible/lecturer	Assoc. Prof Mihaela CIRLUGEA, Ph.D., <a href="mailto:Mihaela.Cirlugea@bel.utcluj.ro">Mihaela.Cirlugea@bel.utcluj.ro</a>						
2.4 Teachers in charge of applications	Assoc. Prof Mihaela CIRLUGEA, Ph.D., <a href="mailto:Mihaela.Cirlugea@bel.utcluj.ro">Mihaela.Cirlugea@bel.utcluj.ro</a> Eng. Diana TERHES, Ph.D student, <a href="mailto:Diana.Terhes@bel.utcluj.ro">Diana.Terhes@bel.utcluj.ro</a>						
2.5 Year of study	II	2.6 Semester	3	2.7 Assessment	V	2.8 Subject category	DF/DI

### 3. Estimated total time

3.1 Number of hours per week	4	Of which: 3.2 course	2	3.3 seminary / laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminary / laboratory	28
Time distribution					hours
Studying the manual, lecture material and notes, references					20
Supplementary study in the library, online and in the field					-
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					16
Tutoring					4
Exams and tests					4
Other activities					-
3.7 Total hours 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	Bases of electronic circuits
4.2 Competencies	Elements of electronic circuits, Matlab Bases of programming

### 5. Requirements (where appropriate)

5.1. for the course	Amphitheatre, Cluj-Napoca
5.2. for the applications	Laboratory, Cluj-Napoca

### 6. Specific competences

<b>Professional competences</b>	C1. Use of the fundamental elements related to devices, circuits, systems, instrumentation and electronic technology C3. Application of the basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques C6. Solving specific problems of the broadband communications networks: propagation in different environment, circuits and equipment for high frequencies (microwaves and optical).
<b>Transversal competences</b>	N/A

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

7.1 General objectives	Developing the competences regarding the use, analysis and design of electronic circuits and MatLab interfaces
7.2 Specific objectives	<ol style="list-style-type: none"> <li>1. Recognizing and understanding basic concepts specific to fundamental mathematical calculus and representations in MatLab.</li> <li>2. Developing skills and abilities necessary for implementing in MATlab electronic circuits.</li> <li>3. Developing skills and abilities for creating and implementing in MATlab an active graphical user interface, applied on electronic circuits</li> </ol>

### 8. Contents

8.1 Course	Teaching methods	Observations
1. Introduction in computer graphics	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Use of .ppt presentation, projector, blackboard
2. Graphic design in electronic projects		
3. Electrical schemes. LTSpice environment		
4. Basic operations and data types in MatLab		
5. Electronic circuit modeling and simulation in Matlab.		
6. Matlab functions. Call. Parameters		
7. Arithmetic operations. Vectors and matrices		
8. 2D and 3D graphical plots		
9. Graphical object generation and control		
10. Data representing. Interpolation and approximation		
11. Data handles in MatLab		
12. Graphical user interfaces. Components		
13. Callback functions		
14. Creating and documenting a project		

References

1. LTSpice- Reference Guide
2. MatWorks- tutorial lessons
3. J.Attia- Electronics and Circuit Analysis Using Matlab
4. S.Ghinea- Matlab
5. Stephen Chapman\_MatLab Programming for Engineers, International student edition, 2008, Stanford, USA
6. Stephen Chapman, MatLab Programming for Engineers,Cengage Learning, Stamford, USA, 2016
7. Scott Smith, MatLab Advanced GUI Development, DOG Ear Publishing, 2006  
[www.bel.utcluj.ro/IGAC](http://www.bel.utcluj.ro/IGAC)

8.2 Laboratory	Teaching methods	Notes
1. Introduction in Orcad.		
2. Editing of graphical elements		
3. Creating the electric schemes		
4. Creating electronic components in LtSpice		
5. Introduction in Matlab. Interface and utilities		
6. Using functions in Matlab		
7. Arithmetical operations in Matlab. Vectors and matrices		
8. Creating GUI		
9. 2D and 3D graphical plots		
10. Graphic objects. Creation and control		
11. Representing data		
12. Numerical integration of differential equations		
13. Electronic circuits modeling in GUI.		
14. Final test		

References

1. LTSpice- Reference Guide
2. MatWorks- tutorial lessons
3. J.Attia- Electronics and Circuit Analysis Using Matlab
4. S.Ghinea- Matlab
5. Stephen Chapman\_MatLab Programming for Engineers, International student edition, 2008, Stanford, USA
6. Stephen Chapman, MatLab Programming for Engineers,Cengage Learning, Stamford, USA, 2016
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**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. Assessment

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	- Summative evaluation written verification (theory and problems)	20%
10.5 Laboratory/Seminary	The level of acquired abilities	- Continuous formative evaluation - practical lab test	80%
10.6 Minimum standard of performance			
C ≥ 5 and E ≥ 5 and 0,8L+0,2C ≥ 5			

Data of filling in:	Responsible	Title First name SURNAME	Signature
13.09.2022	Course	Assoc. Prof Mihaela CIRLUGEA, Ph.D.	
	Applications	Assoc. Prof Mihaela CIRLUGEA, Ph.D.	
		Eng. Diana TERHES, Ph.D student	

Date of approval in the Council of the Communications Department 13.09.2022	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 21.09.2022	Dean Prof. Ovidiu POP, Ph.D.