SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Electronics, Telecommunications and Information Technology
1.3	Department	Bases of Electronics
1.4	Field of study	Electronics and Telecommunications Engineering
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					Electronic devices and circuits					
2.3	Course responsible/lecturer					Assoc. Prof. Mihaela Cirlugea, PhD					
2.4	Teachers in charge of applications					Assistant Professor Lorant Szolga, PhD,					
2.5	Year of study	II	2.6	Semester	1	2.7	Assessment	Colloq	2.8	Subject category	DF/DI

3. Estimated total time

Year / Sem.	Subject name	No. of weeks	Course [hours/week]	Applications [hours/week] S	Applications [hours/week] L	Applications [hours/week] P	Course [hours/sem.]	Applications [hours/sem.] S	Applications [hours/sem.] L	Applications [hours/sem.] P	Indiv. study	TOTAL	Credits
II / 1	Introduction in computer aided graphics	14	2		2		28		28		44	100	4

3.1	Number of hours per week	4	3.2	of which, course	2	3.3	applications	2
3.4	Total hours in the curriculum	56	3.5	of which, course	28	3.6	applications	28

Individual study	Hours
Manual, lecture material and notes, bibliography	16
Supplementary study in the library, online and in the field	-
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	22
Tutoring	3
Exams and tests	3
Other activities	0

3.7	Total hours of 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	N / A
4.2	Competence	Passive components and circuits, programming

5. Requirements (where appropriate)

5.1	For the course	Amphitheatre, Cluj-Napoca
5.2	For the applications	Laboratory, Cluj-Napoca

6. Specific competences

Professional competences	Theoretical knowledge (what the student must know):	To know and edit the electronic component symbols Tto represent data in 2D and 3D structures; To know the implementing and simulation methods of an electronic circuit To be able to understand and implement graphical interfaces in MAtlab
	Acquired skills (what the student is able to do):	After completing the discipline, the students will be able to: - edit the electronic component symbols - to create/compose and edit the electronic scheme of a circuit - to implement in MatLab an electronic circuit - to create and implement an active graphical user interface (GUI)
	Acquired abilities: (what type of equipment the student is able to handle)	After completing the discipline, the students will be able to: - Run OrCad and design electronic circuits - Run MAtLab and perform various mathematical operations over data structures - Create GUIs using the MAtLab environment
	In accordance with Grila1 and Grila2 RNCIS	C1. To use the fundamental elements regarding electronic devices, circuits, systems, instrumentation and technology C3. To apply knowledge, concepts and basic methods regarding computing systems' architecture, microprocessors, microcontrollers, programming languages and techniques C6. To solve wide-band telecommunications networks' specific problems: propagation in various transmission media, high frequency circuits and equipment (microwaves and optical).
Cross competences (Grila1 and Grila2 RNCIS)		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 MatLab programs, especially the GUI
7.2	Specific objectives	1. Recognizing and understanding basic concepts specific to electronic circuit design and representation

		2. Developing skills and abilities necessary for the use of MAtLab environment 3. Developing skills and abilities for creating GUIs

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
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. Orcad environment		
4	Electronic components. Signs and representations.		
5	Electronic circuit modeling and simulation in Matlab. The Matlab program		
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 aproximation		
11	Circuit calculus using MatLab		
12	Graphical user interfaces. Components		
13	Callback functions		
14	Creating a project		
8.2. Applications (lab)		Teaching methods	Notes
1	Introduction in Orcad. Labour protection	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, white/magnetic board
2	Editing of graphical elements		
3	Creating the electric schemes		
4	Electronic components. Symbols		
5	Introduction in Matlab		
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		

Bibliography

1. Orcad- Reference Guide
2. MatLab- 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. www.bel.utcluj.ro/IGAC

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

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. Evaluations

Activity type	10.1	Assessment criteria	10.2	Assessment methods	10.3	Weight in the final grade
Course		The level of acquired theoretical knowledge and practical skills		- Summative evaluation written exam (theory and problems)		- T, max 10 pts. 20%
Applications		The level of acquired abilities		- creating a GUI practical lab test		- L, max. 10 pts. 80%
10.4 Minimum standard of performance						
0,2T+0,8L ≥ 4.5						

Date of filling in	Course responsible	Teachers in charge of applications
1.10.2018	Assoc. Prof. Mihaela Cirlugea, PhD	Assist. Professor Lorant Szolga, PhD