SYLLABUS

1. Data about the program of study

1.1 Institution	The 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
Applied Electronics / Engineer	Applied Electronics / Engineer
1.7 Form of education	Full time
1.8 Subject code	15.00

2. Data about the subject

2.1 Subject name		Graphics on Computer Aided Design					
2.2 Subject area		Theoretical area Methodologic area Analysis area					
2.3 Course responsible/lecturer		Assoc.Prof Mihaela Cîrlugea, Ph.D eng., Mihaela.Cirlugea@bel.utcluj.ro					
2.4 Teachers in charge of applications		Assoc. Prof Mihaela Cîrlugea, Ph.D eng, Mihaela.Cirlugea@bel.utcluj.ro Assist.Prof. Paul Farago, Ph.D eng, Paul.Farago@bel.utcluj.ro Eng. Diana Terhes, PhD Student Diana.Terhes@bel.utcluj.ro					
2.5 Year of study	II	2.6 Semester	1	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					18
Supplementary study in the library, online and in the field					-
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					20
Tutoring					3
Exams and tests					3
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 competencies

Professional Competencies	C1. Usage of the fundamental elements regarding the electronic devices and circuits, technology • C1.1 Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems • C1.4 Usage of the electronic circuits and of the specific methods for editing and characterizing them, using LtSpice • C1.5 Design and implementation of electronic circuits of low / medium complexity using CAD-CAM technologies and standards C3. Application of the basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques • C3.4 Development of programs for a general and / or specific programming language, starting from the specification of the requirements and until the execution, debugging and interpretation of the results in correlation with the processor used • C3.5 Projects involving hardware (processors) and software (programming) components C6. Solving technological problems in the fields of applied electronics • C6.1 Defining the principles and methods underlying the manufacture, adjustment, testing and troubleshooting of the appliances and equipment in the fields of applied electronics
Transversal Competencies	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	1. Recognizing and understanding basic concepts specific to fundamental mathematical calculus and representations in MatLab. 2. Developing skills and abilities necessary for implementing in MAtLab electronic circuits. 3. Developing skills and abilities for creating and implementing in MAtLab an active graphical user interface, applied on electronic circuits

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 aproximation		
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, Stamnford, USA, 2016 7. Scott Smith, MatLab Advanced GUI Development, DOG Ear Publishing, 2006 www.bel.utcluj.ro/IGAC		
8.2 Seminary / laboratory / project	Teaching methods	Notes
Laboratory	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, white/magnetic board
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. Nummerical 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, Stamnford, USA, 2016
7. Scott Smith, MatLab Advanced GUI Development, DOG Ear Publishing, 2006

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

The discipline content and the acquired skills are in agreement with the expectations of the professional organizations (for instance ARIES) and the employers in the field, where the students carry out the internship stages and/or occupy a job in the field of programmers and software or circuit developers, and the expectations of the national organization for quality assurance (ARACIS).

10. Assesment

Activity type	10.1 Assesment criteria	10.2 Assesment methods	10.3 weight in the final grade
10.4 Course	The level of acquired theoretical knowledge and practical skills	- Summative evaluation written colloq (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			

Quality level:

Minimum knowledge:

- Knowledge of graphic design in electronic projects
- Data representing. Interpolation and approximation
- Creating and documenting a project

Minimum competences:

- Recognizing and understanding basic concepts specific to fundamental mathematical calculus and representations in MatLab
- Developing skills and abilities for creating and implementing in MAtLab an active graphical user interface, applied on electronic circuits

Quantitative level:

- $C \geq 5$ and $E \geq 5$ and $0{,}8L+0{,}2C \geq 5$

Data of filling in:	Responsible	Titlu Prenume NUME	Semnătura
29.09.2019	Course	Assoc.Prof Mihaela Cîrlugea, Ph.D eng.	
	Applications	Assoc.Prof Mihaela Cîrlugea, Ph.D eng.	
		Assist.Prof. Paul Farago, Ph.D eng	
		Eng. Diana Terhes, PhD Student	

Date of approval in Department of Bases of Electronics _____	Head Departament Prof. Sorin HINTEA, PhD Eng.
Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology _____	Dean Prof. Gabriel OLTEAN, PhD Eng.