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	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-E20.00/EA-E20.00

2. Data about the subject

2.1	Subject name			Fundamental Electronic Circuits			
2.2	Subject area			Electronic Devices and Circuits			
2.3	Course responsible/lecturer			Assoc. Prof. Laura IVANCIU, Ph.D. - laura.ivanciu@bel.utcluj.ro			
2.4	Teachers in charge of applications			Assoc. Prof. Laura IVANCIU, Ph.D. - laura.ivanciu@bel.utcluj.ro			
2.5 Year of study	II	2.6 Semester	3	2.7 Assessment	E	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	2	3.3 seminar/lab	3
3.4 Total hours in the curriculum	70	3.5 of which, course:	28	3.6 seminar/lab	42
Individual study					hours
Manual, lecture material and notes, bibliography					21
Supplementary study in the library, online and in the field					-
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					28
Tutoring					3
Exams and tests					3
Other activities					-

3.7	Total hours of individual study	55
3.8	Total hours per semester	125
3.9	Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	Relations and theorems for electric circuits, frequency response

		representation; operating principles for electronic devices: diode, operational amplifier, MOSFET and BJT transistors; use of electronic devices in electronic circuits; analysis methods for electronic circuits; voltage transfer characteristics; transfer function

5. Requirements (where appropriate)

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

6. Specific competences

Professional competences	C1. Use of the fundamental elements related to devices, circuits, systems, instrumentation and electronic technology C2. Applying the basic methods for the acquisition and processing of signals 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 C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks
Transversal competences	N/A

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

7.1	General objective	Developing the competences regarding the use of electronic devices, regarding the use, analysis and (re)design of fundamental electronic circuits.
7.2	Specific objectives	1. Recognizing and understanding basic concepts specific to fundamental electronic circuits. 2. Developing skills and abilities necessary for the use of electronic circuits 3. Developing skills and abilities for the analysis and (re)design of electronic circuits.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Introduction. Course Presentation. Transistor Circuits	Presentation, heuristic conversation, exemplification,	Use of .ppt presentation, projector, blackboard
2.	Transistor Digital Circuits. Transistor Amplifier. DC biasing in active region		
3.	MOSFET Biasing and BJT Biasing in active region		

4.	MOSFET Small-Signal Model. MOSFET Basic Amplifiers	problem presentation, teaching exercise, case study, formative evaluation	
5.	BJT Small-Signal Model. BJT Basic Amplifiers		
6.	Frequency Response: CS and CE. Current Sources and Current Mirrors with MOSFET and BJT		
7.	Power Amplifiers. Class A, Class B and Class AB Power Amplifiers		
8.	Feedback Circuits. Feedback Configurations. Negative feedback effects over an amplifier parameters		
9.	DC voltage regulators. Linear voltage regulators with op amp. Over - current and short - circuit protection.		
10.	Integrated voltage regulators. The 723 voltage regulator. Switching voltage regulators.		
11.	Sinusoidal oscillators. Op – amp and Wien bridge oscillators. Automatic control of the amplitude.		
12.	Non-sinusoidal oscillators. Astable multivibrators. LM555 timer.		
13.	Class D power amplifier. Operating principle. PWM generator. Power stage. Low – pass filter.		
14.	Recapitulation. Exam preparation		
8**.2. Applications/Seminars**		Teaching methods	Notes
	Laboratory	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instruments, experimental boards, computers, smart board, blackboard
1.	Introduction. Labor protection		
2.	Collecting experimental data using the computer		
3.	Logic circuits with TMOS		
4.	Single-stage BJT amplifiers. CE configuration		
5.	Single-stage BJT amplifiers. CC, CB configurations		
6.	Class B amplifiers		
7.	Negative feedback effects on amplifiers		
8.	LM7805 voltage regulator		
9.	DC – DC converter		
10.	Multivibrator circuits using the 555 timer		
11.	Sinusoidal oscillator		
12.	Function generator		
13.	Laboratory test		
14.	Lab recovery and finalization of laboratory activity		
	Seminars		
1.	Logic circuits with transistors. D.C. equivalent circuit		
2.	Basic Amplifiers with MOSFET		
3.	Basic Amplifiers with BJT. Current sources		
4.	Power amplifiers. NF Circuits		
5.	DC Voltage Regulators		

6.	Sinusoidal Oscillator		
7.	Nonsinusoidal Oscillators. Recap		

Bibliography

1. Oltean, G.,Electronic Devices, Editura U.T. Pres, Cluj-Napoca, ISBN 973-662-220-7, 2006; 317 pp.
2. Oltean, G., Circuite electronice, UT Pres, Cluj-Napoca, 2007, ISBN 978-973-662-300-4, 203 pp.
3. Sedra, A. S., Smith, K. C., Microelectronic Circuits, Fifth Edition, Oxford University Press, ISBN: 0-19-514252-7, 2004.

On – line references

1. Oltean, G, Fundamentals of Electronic Circuits, on-line: http://www.bel.utcluj.ro/dce/didactic/fec
2. Sipos, Emilia, Ivanciu, Laura, Dispozitive Electronice. Probleme rezolvate, 2016

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 theoretical knowledge and practical skills acquired for the analysis and (re)design of electronic circuits	- Written exam: problem solving	- E, max 10 pts. 60%
10.5 Applications	The level of the abilities acquired for problem solving and experimental analysis of electronic circuits	- Continuous formative evaluation	- L, max. 10 pts. 25% - S, max. 10 pts. 15%
10.6 Minimum standard of performance			

Qualitative level:

1. To recognize and understand basic concepts specific to fundamental electronic circuits.
2. To develop skills and abilities necessary for the use of electronic circuits
3. To analyze and (re)design of electronic circuits.

Quantitative level:

1. Full laboratory attendance
2. Final grade computed as: Grade = 0.6E+0.25L+0.15S, where $L \geq 5$, $E \geq 4$

Data of filling in:	Responsible	Title First name SURNAME	Signature
16.06.2025	Course	Assoc. Prof. Laura IVANCIU, Ph.D.	
	Applications	Assoc. Prof. Laura IVANCIU, 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.