SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Electrical Engineering
1.3	Department	Electrotechnics and Measurements
1.4	Field of study	Electrical Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/ Qualification	Electrical System Cluj-Napoca in English language
1.7	Form of education	Full time
1.8	Subject code	19.00

2. Data about the subject

2.1	Subject name			Electronics			
2.2	Course responsible/lecturer			*Teodosescu Petre Dorel – petre.teodosescu@emd.utcluj.ro*			
2.3	Teachers in charge of seminars			*Bojan Mircea – mircea.bojan@emd.utcluj.ro*			
2.4 Year of study	2	2.5 Semester	1	2.6 Assessment			E
2.7 Subject category	*DF – fundamental, DD – in the field, DS – specialty, DC – complementary*						DD
	DI – compulsory, DO – elective, Dfac – optional						DI

3. Estimated total time

3.1 Number of hours per week	4	of which	3.2 Course	2	3.3 Seminar	-	3.3 Laboratory	1	3.3 Project	1
3.4 Total hours in the curriculum	56	of which	3.5 Course	28	3.6 Seminar	-	3.6 Laboratory	14	3.6 Project	14

3.7 Individual study:	
(a) Manual, lecture material and notes, bibliography	28
(b) Supplementary study in the library, online and in the field	5
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	28
(d) Tutoring	5
(e) Exams and tests	3
(f) Other activities	

3.8 Total hours of individual study (summ (3.7(a)…3.7(f)))	69
3.9 Total hours per semester (3.4+3.8)	125
3.10 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Technical physics, electrical circuit theory
4.2	Competence	Knowledge of basic physical phenomena related to electricity

5. Requirements (where appropriate)

5.1	For the course	Online, Teams platform
5.2	For the applications Seminar /Laboratory/Project	Onsite-Cluj Napoca, Bistrita Online, Teams platform

6. Specific competences

Professional competences	- Ability to address and manage specific general electronics applications. - Ability to use modern engineering techniques, skills and tools required for engineering practice. - Ability to design, simulate and perform experiments, as well as to analyze and interpret the information obtained. - Ability to approach and manage general applications in electrical engineering. - Ability to work in inter and multidisciplinary teams, to communicate effectively and to understand professional and ethical responsibilities.
Cross competences	-

7. Expected learning outcomes

Knowledge	The student/graduate identifies, formulates, analyzes the principles of electricity circuits and the risks associated with them.
Abilities	The student/graduate develops analog and digital, electrical and electronic circuits, systems and products.
Responsibility and autonomy	The student/graduate demonstrates autonomy in learning specific engineering issues.

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

8.1	General objective	Ability to address and manage specific general electronics applications.
8.2	Specific objectives	Ability to design, simulate and perform experiments, as well as to analyse and interpret the information obtained. Ability to use modern engineering techniques, skills and tools required for engineering practice.

9. Contents

9.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
Course 1. Introduction to electronics	2	Power Point presentations and demonstrations	-
Course 2. Classification domains and electronics applications	2		
Course 3. Semiconductor devices. Overview	2		
Course 4. The junction p-n. Diode. Characteristics	2		
Course 5. Basic electronic circuits with diodes	2		
Course 6. The bipolar transistor. Characteristics	2		
Course 7. Basic electronic circuits with bipolar transistors	2		

Course 8. Field effect transistors. Characteristics	2		
Course 9. Multi-junction semiconductor devices. The thyristor. Insulated Gate Bipolar Transistor - IGBT	2		
Course 10. Electronic amplifiers. Reaction in electronic circuits	2		
Course 11. Operational amplifiers. Overview	2		
Course 12. Fundamental circuits with operational amplifiers	2		
Course 13. Transistor Command circuits	2		
Course 14. Basic electronic signal processing circuits.	2		
Bibliography 1. Marschalko, R. - Electronica pentru ingineri electrotehnicieni, Volumul I, Dispozitive şi circuite electronice fundamentale, ISBN 973-9357-63-6, Editura Mediamira, Cluj, România, 2003. 2. Marschalko, R.; Bojan, M.; Salomir, C. - Electronica pentru ingineri electrotehnicieni, Ghid practic pentru seminar şi laborator, Volumul I, ISBN 973-9357-68-7, Editura Mediamira, Cluj, România, 2004. 3. Marschalko, R. - Electronica pentru ingineri electrotehnicieni, Vol. II, Circuite electronice pentru semnale continue, 154 pag., ISBN(10)973-713-106-1, ISBN(13)978-973-713-106-5 , Editura Mediamira, Cluj, România, 2006. 4. Marschalko, R.; Fodor, D.; Teodosescu, P.: Electronica pentru ingineri electrotehnicieni, Volumul IV, Elemente moderne de electronică de putere, ISBN 978-973-713-315-1, 480 pag., Editura Mediamira, Cluj, România, 2014 5. 5. http://epe.utcluj.ro/index.php/pentru-studenti/			
9.2. Seminar /Laboratory/Project	Number of hours	Teaching methods	Notes
Laboratory 1. Introduction and labour protection. Study of passive R-C circuits	2	- Practical realization of the assemblies - Carrying out practical measurements - Simulations of electronic circuits	The practical activities in the laboratory are conditioned by the observance of the sanitary rules imposed in the academic year 2020-2021 and they will be carried out onsite and / or online.
Laboratory 2. Diode characteristics	2		
Laboratory 3. Diode rectifiers	2		
Laboratory 4. Transistor characteristics	2		
Laboratory 5. DC and AC amplifiers with transistors	2		
Laboratory 6. Electronic circuits with operational amplifiers	2		
Laboratory 7. Verification, testing, evaluation, and grading corresponding to laboratory activities	2		
Project 1. Introduction and labour protection. Introduction to the simulation environment. Circuits with resistors. The resistive divider.	2		
Project 2. Current limitation by LEDs. Simulation of uncontrolled rectifiers. Calculation and dimensioning.	2		
Project 3. The bipolar transistor as a switching element. Simulation and dimensioning of circuits with switching bipolar transistors. Tilting circuits.	2		
Project 4. Simulation and dimensioning of DC and AC amplifiers with transistors.	2		
Project 5. Simulation and dimensioning of basic circuits with operational amplifiers.	2		
Project 6. Applications with operational amplifiers. Design of circuits with comparators.	2		
Project 7. Activity verification, evaluation, and grading	2		
Bibliography 1. Marschalko, R. - Electronica pentru ingineri electrotehnicieni, Volumul I, Dispozitive şi circuite electronice fundamentale, ISBN 973-9357-63-6, Editura Mediamira, Cluj, România, 2003.			

2. Marschalko, R.; Bojan, M.; Salomir, C. - Electronica pentru ingineri electrotehnicieni, Ghid practic pentru seminar şi laborator, Volumul I, ISBN 973-9357-68-7, Editura Mediamira, Cluj, România, 2004.
3. Marschalko, R. - Electronica pentru ingineri electrotehnicieni, Vol. II, Circuite electronice pentru semnale continue, 154 pag., ISBN(10)973-713-106-1, ISBN(13)978-973-713-106-5 , Editura Mediamira, Cluj, România, 2006.
4. Marschalko, R.; Fodor, D.; Teodosescu, P.: Electronica pentru ingineri electrotehnicieni, Volumul IV, Elemente moderne de electronică de putere, ISBN 978-973-713-315-1, 480 pag., Editura Mediamira, Cluj, România, 2014
5. http://epe.utcluj.ro/index.php/pentru-studenti/

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

Electronic discipline and the principles analysed in it are found in many applications of electrical engineers.

11. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	- Answers to questions from the topic presented in the course.	Online platform grid type exam – 50 points	50%
10.5 Laboratory	- Portfolio of laboratories and topics - Realization of a practical circuit - Answers to questions from the laboratory topic	Laboratory/Online platform grid evaluation and laboratory evaluation – 25 points	25%
10.5 Project	- Project documentation - Electronic circuit simulation - Answers to questions	Laboratory/Online evaluation - – 25 points	25%
10.6 Minimum standard of performance			
Minimum 50 points by summing the points obtained on all the activities: Course, Laboratory and Project • 100 points = 10 (final grade)			

Date of filling in: 21.09.2025		**Title Surname Name**	**Signature**
	Lecturer	Teodosescu Petre Dorel	
	Teachers in charge of application	Bojan Mircea	

Date of approval in the ETHM Department Council

January 2026

Head of Department:
Prof. Eng. MICU Dan Doru, PhD

Date of approval in the Faculty of Electrical Engineering Council

February 2026

Dean:
Assoc. Prof. Eng. CZIKER Andrei, PhD