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	1.00

2. Data about the subject

2.1	Subject name				Mathematical analysis	
2.2	Course responsible/ lecturer				*Conf. dr. Adrian Holhos*	
2.3	Teachers in charge of Seminars/ Laboratory/ Project				*Conf. dr. Adrian Holhos*	
2.4 Year of study		I	2.5 Semester	1	2.6 Type of assessment *(E – exam, C – colloquium, V – verification)*	E
2.7 Subject category		*DF – fundamental, DD – in the field, DS – specialty, DC – complementary*				DF
		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	2	3.3 Laboratory	0	3.3 Project	0
3.2 Total hours per semester	56	of which	3.5 Course	28	3.6 Seminar	28	3.6 Laboratory	0	3.6 Project	0

3.7 Individual study:	
(a) Manual, lecture material and notes, bibliography	28
(b) Supplementary study in the library, online and in the field	11
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	24
(d) Tutoring	
(e) Exams and tests	6
(f) Other activities	
3.8 Total hours of individual study *[sum (3.7(a) to 3.7(f))]*	69
3.9 Total hours per semester *[sum of 3.4 and 3.8]*	125
3.10 Number of credit points	5

4. Prerequisites (where applicable)

4.1	Curriculum	High School Mathematical Analysis Knowledge
4.2	Competences	N/A

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications	Attendance at the seminar is mandatory

6. Specific competences

Professional competences	Adequate application of the fundamental knowledge of mathematics, physics, specific chemistry, in the field of electrical engineering After completing the course, students will be able to: ✓ Description of basic concepts, theories and methods of mathematics, physics, chemistry, suitable for the field of electrical engineering ✓ Explaining and interpreting the phenomena presented in the field and specialized disciplines, using the fundamental knowledge of mathematics, physics, chemistry

	✓ Application of general scientific rules and methods for solving problems specific to electrical engineering ✓ Assessing the quality, advantages and disadvantages of some methods and procedures in the field of electrical engineering, as well as the level of scientific documentation of the projects and the consistency of the programs using scientific and technical methods ✓ Elaboration of professional projects, adequately using the fundamental knowledge of mathematics, physics, chemistry
Cross competences	

7. Expected learning outcomes

Knowledge	The student/graduate identifies and describes basic concepts, principles, and methods in mathematics, physics, chemistry, technical drawing, economics, and computer science.
Abilities	The student/graduate operates with basic concepts, principles, and methods from fundamental disciplines. The student/graduate solves problems of mathematics, physics and chemistry with applicability in engineering and validates the solution obtained. The student/graduate performs engineering and economic calculations of medium complexity and associates them with graphic representations of letters or specific to computer-aided design. The student/graduate describes physico-chemical and economic phenomena and processes.
Responsibility and autonomy	The student/graduate applies the values of ethics and deontology of the engineering profession. The student/graduate practices logical reasoning, evaluation and self-evaluation in decision-making.

8. Discipline objectives (based on specific competencies acquired)

8.1	General objective	Using logic and reasoning to identify alternative solutions, draw conclusions, or address specific problems.
8.2	Specific objectives	- Identification of complex problems and study of related information for the development and evaluation of options and for the implementation of solutions. - Providing the necessary elements for the study of the other disciplines.

9. Contents

9.1. Course (Lectures)		Number of hours	Teaching methods	Additional remarks
1	Strings of real numbers	2	With chalk on the board	Students have the Course materials as the teaching takes place
2	Numerical series	2		
3	Function strings and series	2		
4	Power series	2		
5	Taylor Series Developments	2		
6	Fourier Series	2		
7	Sinus and cosine series	2		

8	Metric spaces	2		
9	Function limits. Continuity of functions	2		
10	Derivability of functions. Partial derivatives	2		
11	Derivation of compound functions	2		
12	Differential	2		
13	Default functions	2		
14	Extreme	2		
9.2. Seminar		Number of hours	Teaching methods	Additional remarks
1	Derivatives si integral	2	Solving problems on the blackboard. Adding homework	Students have models of solved problems such as those done at the seminar in electronic version
2	Strings of real numbers	2		
3	Series amounts	2		
4	Study of the convergence of numerical series	2		
5	Function strings and series	2		
6	Power series	2		
7	Taylor Series Developments	2		
8	Fourier Series	2		
9	Sinus and cosine series	2		
10	Function limits	2		
11	Partial derivatives	2		
12	Derivation of compound functions	2		
13	Default functions	2		
14	Differential and extremes	2		

Bibliography

[1] Alexandra Ciupa, Analiza matematica, Editura Mediamira, 1995.
[2] Ioan Gavrea, Analiza matematica, Editura Mediamira, 2004.
[3] R. Bartle, D. Sherbert, Introduction to Real Analysis, John Wiley & Sons, Inc., 2000.
[4] Donciu N., Flondor D. Algebra si analiza matematica. Culegere de probleme, vol.1, 1979.

10. Alignment of course content with expectations of the epistemic community, professional associations, and representative employers in the field

The acquired skills can be used by Electrical Engineering Engineers in the design of electrical equipment.

11. Assessment

Activity type	11.1 Assessment criteria	11.2 Assessment methods	11.3 Weight in the final grade (%)
11.4 Course	Grades from 1 to 10	2 topics in the written paper	25%
11.5 Seminar	Grades from 1 to 10	6 topics in the written paper	75%
11.6 Minimum standard of performance: Understanding of basic notions and terminology; Problem solving. The minimum grade is 5.			

Date of completion	Lecturers	Title/ Surname/ Name:	Signature
September 2025	Course	Conf. dr. ing. Adrian Holhos	
	Applications Seminar/ Laboratory/ Project	Conf. dr. ing. Adrian Holhos	

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