SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Mathematics
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	Applied Electronics, Telecommunications Technologies and Systems / Engineer
1.7 Form of education	Full time
1.8 Subject code	8.00

2. Data about the subject

2.1 Subject name	Special Mathematics							
2.2 Subject area	Theoretical area Methodological area Analytic area							
2.3 Course responsible	Prof. Dr. Gavrea Ioan – ioan.gavrea@math.utcluj.ro Prof. Dr. Popa Dorian – popa.dorian@math.utcluj.ro Conf. Dr. Holhoș Adrian – adrian.holhos@math.utcluj.ro							
2.4 Teacher in charge with seminar / laboratory / project	Conf. Dr. Holhoș Adrian – adrian.holhos@math.utcluj.ro Lect. Dr. Alina Baias – baias.alina@math.utcluj.ro Asist. Drd. Orzan Alexandru – alexandru.orzan@math.utcluj.ro							
2.5 Year of study	1	2.6 Semester	2	2.7 Assessment	E	2.8 Subject category	DF

3. Estimated total time

3.1 Number of hours per week		of which: 2 course		2 seminar / laboratory	
3.4 To Total hours in the curriculum		of which: 28 course		28 seminar / laboratory	

Distribution of time	hours
Manual, lecture material and notes, bibliography	24
Supplementary study in the library, online specialized platforms and in the field	6
Preparation for seminars / laboratories, homework, reports, portfolios and essays	24
Tutoring	
Exams and tests	2
Other activities:	

3.7 Total hours of individual study	69
3.8 Total hours per semester	125
3.9 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 curriculum	*Mathematical Analysis, Linear Algebra*

4.2 competence	Operating with basic Mathematical, Engineering and Computer Science concepts

5. Requirements (where appropriate)

5.1. for the course	Basic knowledge of Integral Calculus for one variable and complex numbers
5.2. for the seminars/laboratories / projects	Basic knowledge of Integral Calculus for one variable and complex numbers

6. Specific competences

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

7.1 General objective	A presentation of the concepts, notions, methods and fundamental techniques used in integral calculus and complex functions
7.2 Specific objectives	Use of the integral calculus and the complex functions in order to solve problems in engineering

8. Contents

Course	Teaching methods	Notes
Course 1 - Improper integrals.		
Course 2 - Integrals with parameters. The Gamma and Beta functions.		
Course 3 - Line integrals of the first kind.		
Course 4 - Line integrals of the second kind.		
Course 5 - Differential forms.		
Course 6 - Measurable sets in R^n. The Riemann integral in R^n.		
Course 7 - Evaluation of multiple integral by iteration.	Explanation	
Course 8 - Change of variables in multiple integrals.	Demonstration	
Course 9 - Surface integrals of the first and second kind.	Collaboration	
Course 10 - Integral formulas: Green, Stokes, Gauss-Ostrogradski.	Interactive activities	
Course 11 - Holomorphic functions. Cauchy-Riemann equations.		
Course 12 - Complex integral. Cauchy Theorem.		
Course 13 - Taylor series. Laurent series		
Course 14- Residue Theorem		

Bibliography:
1. T. Apostol, Mathematical Analysis, Addison-Wesley Publishing Company, 1981.
2. A. Ciupa, A. Holhoș, Calcul integral-culegere de probleme, Casa cărții de știință, Cluj-Napoca, 2011.
3. P. Flondor, O. Stanasila, Lecții de analiza matematica, Editura All, Bucuresti, 1993.
4. I. Gavrea, Calcul integral, Editura Mediamira, Cluj-Napoca, 2008.
5. I. Gavrea, Matematici speciale, Editura Mediamira, Cluj-Napoca, 2006.
6. S. Lang, Undergraduate Analysis, Springer, 1997.
7. D. Popa, Calcul integral, Mediamira, Cluj-Napoca, 2005.

8.2 Seminar/laboratory / project	Teaching methods	Notes
1 - Improper integrals.		
2 - Integrals with parameters. The Gamma and Beta functions.		
3 - Line integrals of the first kind.		
4 - Line integrals of the second kind.	Explanation	
5 - Differential forms.	Demonstration	
6 - Measurable sets in R^n. The Riemann integral in R^n.	Collaboration	
7 - Evaluation of multiple integral by iteration.	Interactive activities	
8 - Change of variables in multiple integrals.		

9 - Surface integrals of the first and second kind.		
10 - Integral formulas: Green, Stokes, Gauss-Ostrogradski.		
11 - Holomorphic functions. Cauchy-Riemann equations.		
12 - Complex integral. Cauchy Theorem.		
13 - Taylor series. Laurent series		
14- Residue Theorem		
Bibliography		

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 and the employers in the field, where the students carry out the internship stages and/or occupy a job (in the field of *……..*), and the expectations of the national organization for quality assurance (ARACIS).

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 acquired theoretical knowledge and practical skills	*Written paper online/face to face*	*80%*
10.5 Seminar	The level of acquired knowledge and abilities	*Partial tests*	*20%*
10.6 Minimum standard of performance			
✓ Five grade			

Date of filling in: 20.06.2023	Responsible	Title Surname NAME	Signature
	Course	Prof. Dr. Ioan GAVREA	
		Prof. Dr. Dorian POPA	
		Conf. Dr. Adrian HOLHOȘ	
	Applications	Conf. Dr. Adrian HOLHOȘ	
		Lect. Dr. Alina BAIAS	
		Asist. Drd. Alexandru ORZAN	

Date of approval in the Department of Mathematics	Head of Department of Mathematics Prof. dr. Dorian Popa
Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology 12.07.2023	Dean Prof. dr. eng. Ovidiu POP