

SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
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 / Engineer
1.7 Form of education	Full time
1.8 Subject code	<i>Codul disciplinei se găsește pe site la secțiunea "Planuri de învățământ" (https://etti.utcluj.ro/planuri-de-invatamant.html)</i>

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. Dorian Popa, popa.dorian@math.utcluj.ro		
2.4 Teacher in charge with seminar / laboratory / project	Conf. dr. Alina Ramona Baias, baias.alina@math.utcluj.ro		
2.5 Year of study	2.6 Semester	2.7 Assessment	2.8 Subject category

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					
Supplementary study in the library, online specialized platforms and in the field					
Preparation for seminars / laboratories, homework, reports, portfolios and essays					
Tutoring					
Exams and tests					
Other activities:					
3.7 Total hours of individual study					
3.8 Total hours per semester					
3.9 Number of credit points					

4. Pre-requisites (where appropriate)

4.1 curriculum	<i>Mathematical Analysis, Linear Algebra</i>
4.2 competence	Operating with basic Mathematical, Engineering and Computer Science concepts C1.1 – Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems C1.3 – Building models for various components of

	computing systems C1.5 – Providing a theoretical background for the characteristics of the designed systems
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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 1 – Line integrals of the first kind	Teaching methods	Notes
Course 2 – Line integrals of the second kind	Explanation Demonstration Collaboration Interactive activities	
Course 3 – Differential forms		
Course 4 – Measurable sets in \mathbb{R}^n		
Course 5 – The Riemann integral in \mathbb{R}^n		
Course 6 – Evaluation of multiple integral by iteration		
Course 7 – Change of variables in multiple integrals		
Course 8 – Surface integrals of the first kind.		
Course 9 – Surface integrals of the second kind.		
Course 10 -Integral formulas: Green, Stokes, Gauss-Ostrogradski		
Course 11 –Holomorphic functions. Cauchy-Riemann equations		
Course 12 – Complex integral		
Course 13 – Taylor series. Laurent series		
Course 14- Residue theorem		
Bibliography: T.Apostol, Mathematical Analysis, Addison-Wesley Publishing Company, 1981. S.Lang, Undergraduate Analysis, Springer, 1997. D. Popa, Calcul integral, Editura Mediamira, 2005		
8.2 Seminar/laboratory / project	Teaching methods	Notes
Seminar 1 – Line integrals of the first kind	Explanation Demonstration Collaboration Interactive activities	
Seminar 2 – Line integrals of the second kind		
Seminar 3 – Differential forms		
Seminar 4 – Measurable sets in \mathbb{R}^n		
Seminar 5 - The Riemann integral in \mathbb{R}^n		
Seminar 6 – Evaluation of multiple integral by iteration		
Seminar 7 – Change of variables in multiple integrals		
Seminar 8 – Surface integrals of the first kind.		
Seminar 9 – Surface integrals of the second kind.		
Seminar 10 - Integral formulas: Green, Stokes, Gauss-Ostrogradski		
Seminar 11 –Holomorphic functions. Cauchy-Riemann equations		
Seminar 12 – Complex integral		
Seminar 13 – Taylor series. Laurent series		
Seminar 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	<i>Written paper/online/face to face</i>	80%
10.5 Seminar/Laboratory	The level of acquired knowledge and abilities	<i>Partial tests</i>	20%
10.6 Minimum standard of performance			
✓			

Date of filling in:	Responsible	Title Surname NAME	Signature
	Course	Prof. dr. Dorian Popa	
	Applications	Conf. dr. Alina Baias Conf. dr. Diana Otrocol	

Date of approval in the Department of Mathematics	Head of Department of Mathematics
05.06.2024	Prof. dr. Dorian Popa
	
Date of approval in the Council of Automation and Computer Science	Dean
	Prof. dr. eng. Mihaela Dinsoreanu