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	Telecommunications Technologies and Systems/ Engineer Applied Electronics/Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E08.00/EA-E08.00

2. Data about the subject

2.1 Subject name	Special Mathematics						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3Course responsible	Prof. Dorian POPA, Ph.D. – Popa.Dorian@math.utcluj.ro						
2.4Teacher in charge with seminar / laboratory / project	Prof. Dorian POPA, Ph.D. – Popa.Dorian@math.utcluj.ro						
2.5Year of study	1	2.6Semester	2	2.7Assessment	E	2.8Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 seminar / laboratory	2
3.4 To Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar / laboratory	28

Distribution of time	hours
Manual, lecture material and notes, bibliography	30
Supplementary study in the library, online specialized platforms and in the field	5
Preparation for seminars / laboratories, homework, reports, portfolios and essays	28
Tutoring	3
Exams and tests	3
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)

4.1curriculum	Mathematical Analysis, Linear Algebra Operating with basic Mathematical, Engineering and Computer Science concepts
4.2 competence	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

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

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 C3. Application of the basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques
Transversal competences	N/A

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 R^n		
Course 5 The Riemann integral in 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:

1. T.Apostol, Mathematical Analysis, Addison-Wesley Publishing Company, 1981.
2. S.Lang, Undegraduate Analysis, Springer, 1997.
3. D. Popa, Calcul integral, Editura Mediamira, 2005

8.2 Seminar/laboratory / project	Teaching methods	Notes
Seminar 1 – Line integrals of the first kind Seminar 2 – Line integrals of the second kind Seminar 3 – Differential forms Seminar 4 – Measurable sets in R^n Seminar 5 - The Riemann integral in 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	Explanation Demonstration Collaboration Interactive activities	
Bibliography 1. T.Apostol, Mathematical Analysis, Addison-Wesley Publishing Company, 1981. 2. S.Lang, Undegraduate Analysis, Springer, 1997. 3. D. Popa, Calcul integral, Editura Mediamira, 2005		

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 acquired theoretical knowledge and practical skills	Written paper	80%
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	Partial tests	20%
10.6 Minimum standard of performance			
✓			

Date of filling in:	Responsible	Title Surname NAME	Signature
20.06.2023	Course	Prof. Dorian POPA, Ph.D.	
	Applications	Prof. Dorian POPA, Ph.D.	

Date of approval in the Council of the Communications Department 11.07.2023	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 12.07.2023	Dean Prof. Ovidiu POP, Ph.D.