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	Matematica
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	09.00

2. Data about the subject

2.1 Subject name	Differential Equations						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3Course responsible	Prof. univ. Dorian Popa – Popa.Dorian@math.utcluj.ro						
2.4Teacher in charge with seminar / laboratory / project	Lect. dr. Alina Baias – baias.alina@math.utcluj.ro						
2.5Year of study 1		2.6Semester 1		2.7Assessment		2.8Subject category	

3. Estimated total time

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

4. Pre-requisites (where appropriate)

4.1curriculum	*Calculus.Functions of one variable*
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

5. Requirements (where appropriate)

5.1. for the course	Basic knowledge of differential and integral Calculus for one variable
5.2. for the seminars/laboratories / projects	Basic knowledge of differential and integral Calculus for one variable

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 differential equations.
7.2 Specific objectives	Use of the differential equations in order to solve problems in engineering

8. Contents

	Teaching methods	Notes
1. Introduction. Examples which lead to differential equations. Basic notions. Problems concerning differential equations	Teaching methods	Notes
2. Differential equations of order one		
3. Existence and uniqueness theorem for the Cauchy problem		
4. Series solutions for differential equations. Bessel equation and Bessel functions		
5. Linear equations of order n		
6. Linear and homogeneous equations with constant coefficients	Explanation Demonstration Collaboration Interactive activities	
7. Linear and nonhogeneous equations with constant coefficients. Euler's equation		
8. Linear systems of differential equations		
9. Symmetrical systems		
10. The Laplace transform. Applications		
11. Partial Differential Equations of first order. Cauchy problems		
12. Partial differential equations of second order.		
13. Wave equation. Separation of variables.		
14. Mixed problems applications. Recapitulative problems		

8.2 Seminar/laboratory / project	Teaching methods	Notes
1. Differential equations of order one 2. Problems concerning differential equations of order one 3. Differential equations reducible to order one 4. Cauchy problem. Differential inequalities 5. Differential equations integrated by series. Applications of Bessel functions 6. Linear and nonhomogeneous equations of order n. Lagrange method 7. The method of undetermined coefficients. Euler's equation 8. Systems of differential equations 9. Applications of Laplace transform 10. Linear Partial differential equations of order one 11. Cvasilinear partial differential equations of order one 12. Partial differential equations of order two 13. Applications of partial differential equations of order two. 14. Applications of mixed problems. Recapitulative problems.	Explanation Demonstration Collaboration Interactive activities	
Bibliography 1. V. Barbu, Ecuatii diferentiale, Editura Junimea, 1985. 2. Peter J.Collins, Differential and Integral Equations, Oxford University Press, 2005.		

3. R.P.Agarval, D.O'Regan, An Introduction to Ordinary Differential Equations, Springer, 2008.
4. D.Popa, Calculus, Mediamira Cluj-Napoca, 2006.
5. Lungu, N., NovacA., Dincuta, V., Inoan, D., Rus, M., Differential Equations: Collection of problems, Matrix Rom, 2009.

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	*Probă scrisă/online/face to face*	Exam: 20% theory+80% applications
10.5 Seminar/Laboratory	The level of acquired knowledge and abilities	*Verificare pe parcurs prin teste de laborator*	Exam: 20% theory+80% applications
10.6 Minimum standard of performance: mark 5			

Date of filling in: 20.06.2023	Responsible	Title Surname NAME	Signature
	Course	Prof. dr. Dorian Popa	
	Applications	Lect. dr. Alina Baias	

Date of approval in the Department of Mathematics
20.06.2023

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

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Prof. dr. eng. Ovidiu POP