SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Automation and Computer Science
1.3	Department	Mathematics
1.4	Field of study	Electronics and Telecommunications Engineering
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-E09.00, EA-E09.00

2. Data about the subject

2.1	Subject name					Differential Equations					
2.2	Subject area					Mathematics					
2.3	Course responsible/lecturer					Prof. mat. Dorian POPA, PhD					
2.4	Teachers in charge of applications					Prof. mat. Ioan Radu PETER, PhD					
2.5	Year of study	I	2.6	Semester	2	2.7	Assessment	Exam	2.8	Subject category	DF/ DI

3. Estimated total time

Year/ Sem.	Subject name	No. of weeks	Course	Applications			Course	Applications			Indiv. study	TOTAL	Credits
			[hours/week]				[hours/sem.]						
				S	L	P		S	L	P			
I / 2	Differential Equations	14	2	2			28	28			69	125	5

3.1	Number of hours per week	4	3.2	of which, course	2	3.3	applications	2
3.4	Total hours in the curriculum	42	3.5	of which, course	28	3.6	applications	28

Individual study	Hours
Manual, lecture material and notes, bibliography	35
Supplementary study in the library, online and in the field	-
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	28
Tutoring	3
Exams and tests	3
Other activities	0

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

Acquired competences :
Acquired skills (what the student is able to do):
Notions and results concerning differential equations and partial differential equations of order one and two. Cauchy problem for different type of equations. Bessel equation and Bessel functions. Dynamical systems.
Acquired abilities: (what type of equipment/instruments/software the student is able to handle)
To solve a differential equation and a system of differential equations. To operate with Bessel functions To use differential equations in some applications

Prerequisites (if necessary)
Notions on mathematical analysis, algebra and trigonometry from high school

A. Course/Lecture (course/lecture titles)	
	1. Examples which lead to differential equations 2. Basic notions. Problems concerning differential equations 3. Differential equations of order one 4. Existence and uniqueness theorem for the Cauchy problem 5. Linear equations of order n. 6. Linear and homogeneous with constant coefficients 7. Linear and nonhogeneous equations with constant coefficients. 8. Series solutions for differential equations 9. Bessel equation and Bessel functions 10. Linear systems of differential equations 11. Partial Differential Equations of order one. 12. Cauchy problem for partial differential equations of order one 13. Linear partial differential equations of order two. 14. Wave equation .Separation of variables.

B1. Applications - Seminar (contents)	
	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. Linear and nonhomogeneous equations of order n 6. Differential equations integrated by series 7. Applications of Bessel functions 8. Systems of differential equations 9. Applications of Laplace transform 10. Partial differential of order one 11. Linear partial differential equations of order one 12. Cvasilinear partial differential equations of order one 13. Partial differential equations of order two 14. Applications of partial differential equations of order two.
C. Individual study (reference study contents, synthesis materials, projects, applications etc.)	
14 sets of problems (the preparation part in every laboratory). Applications of differential equations in comunications.	

References (Textbooks, courses, laboratory manual, exercise book)
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.

Final evaluation	
Evaluation method	Writen paper – 3 hours, containing theory and problems. After 7 courses partial evaluation (3 hours)
Mark components	Seminar S Theory T Problems P
Mark computation	N=0,2S+0,2T+0,6P

Date of filling in	Course responsible	Teachers in charge of applications
1.10.2018	Prof. Dorian POPA, PhD	Prof. Ioan Radu PETER, PhD