Politehnica University of Bucharest
Faculty of Electronics, Telecommunications and Information Technology

COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	University Politehnica of Bucharest
1.2 Faculty	The Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Department of Applied Electronics and Information Engineering
1.4 Domain of studies	Electronics and Telecommunications Engineering
1.5 Cycle of studies	Licence
1.6 Program of studies/Qualification	Applied Electronics

2. Course identification information

2.1 Name of the course				Mathematical Analysis 2			
2.2 Lecturer				Dr. Petrescu-Nita Alina Claudia			
2.3 Instructor for practical activities				Dr. Petrescu-Nita Alina Claudia			
2.4 Year of studies	I	2.5 Semester	II	2.6 Evaluation type	Exam	2.7 Course choice type	compulsory

3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week, out of which	5	3.2 course	3	3.3 practical activities	2
3.4 Total hours in the curricula, out of which	70	3.5 course	42	3.6 practical activities	28

Distribution of time	hours
Study according to the manual, course support, bibliography and hand notes	34
Supplemental documentation (library, electronic access resources, in the field, etc)	6
Preparation for practical activities, homeworks, essays, portfolios, etc.	20
Tutoring	0
Examinations	3
Other activities	0

3.7 Total hours of individual study	60
3.9 Total hours per semester	130

3. 10 Number of ECTS credit points	5

4. Prerequisites (if applicable)

4.1 curricular	- Passing Mathematical Analysis I and Algebra and Geometry Courses
4.2 competence-based	- General knowledge of derivatives, integral calculus and calculus with complex numbers

5. Requisites (if applicable)

5.1 for running the course	
5.2 for running of the applications	

6. Specific competences

Professional competences	- recognizing and solving classical differential equations - methods for solving linear differential equations and systems with constant coefficients - classification of a partial second-order equations - complex integral using residue theorem - applications of the Fourier, Laplace and Z transform
Transversal competences	

7. Course objectives (as implied by the grid of specific competences)

7.1 General objective of the course	Fundamental discipline indispensable to any specialized approach. The following basic notions are presented: theory of differential equations, partial second order-equations and fundamental notions of complex analysis. Moreover, the properties of Fourier, Laplace and Z transforms with applications are discussed.
4.2 Specific objectives	Generally the types of exercises and problems deal with the chapters of the courses. The difficult theoretical questions are disccused as well. For some problems the software MATHEMATICA or MAPLE are used.

8. Content

8.1 Lectures	Teaching techniques	Remarks
Elementary differential equations	- lectures at the	3

	blackboard - utilization of MATHEMATICA or MAPLE	
Cauchy problem. Existence and uniqueness theorem. Differential systems of first order.		3
Linear differential systems; fundamental matrix		3
Linear high order differential equation. Euler's equation		3
Elementary differential equations		3
Cauchy problem. Existence and uniqueness theorem. Differential systems of first order.		3
Partial first order equations		3
Partial second-order equations. Classification		3
Hyperbolic and parabolic secon-order equations. Dirichlet's problem		3
Holomorphic functions. Taylor's and Laurent's series.		3
Cauchy' theorems and residue theorem.		3
Applications for computation of complex integrals		3
Z-transform		3
Fourier' transform; properties		3
Laplace's transform; applications		3
The definition of some special functions		3

Bibliography(texts elaborated by the membres of Department of Mathematical Methods and Models)

1. Ana Nita si Alina Nita *Probleme de ecuaţii diferenţiale* , Editura Printech Bucureşti 2005
2. Alina Nita, Luminita Costache, Raluca Dumitrache-*Matematici speciale. Notiuni teoretice.Aplicatii* Editura Printech , Bucuresti , 2007.
3. Alina Petrescu-Nita - *Analiza matematica II*, Editura Printech 2014

4. Costache, T.-L.; Oprisan, Gh. *Transformari integrale,* Printech, Bucuresti 2004
5. Oprisan, Gh.; Georgescu, C. *Matematici avansate – M3,* Printech, Bucuresti, 2008
6. Cristina Bercia, Romeo Bercia - *Matematici speciale. Teorie si aplicatii*, Editura Printech, Bucuresti, 2010

8.1 Practical activities	Teaching techniques	Remarks
Elementary differential equations		2
Cauchy problem. Existence and uniqueness theorem. Differential systems of first order.		2
Linear differential systems; fundamental matrix		2
Linear high order differential equation. Euler's equation		2
Elementary differential equations		2
Cauchy problem. Existence and uniqueness theorem. Differential systems of first order.		2
Partial first order equations		2
Partial second-order equations. Classification		2
Hyperbolic and parabolic secon-order equations. Dirichlet's problem		2
Holomorphic functions. Taylor's and Laurent's series.		2
Cauchy' theorems and residue theorem.		2
Applications for computation of complex integrals		2
Z-transform		2
Fourier' transform; properties		2
Laplace's transform; applications		2
The definition of some special functions		2

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1. Ana Nita si Alina Nita *Probleme de ecuaţii diferenţiale* , Editura Printech Bucureşti 2005
2. Alina Nita, Luminita Costache, Raluca Dumitrache-*Matematici speciale. Notiuni teoretice.Aplicatii* Editura Printech , Bucuresti , 2007.
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6. Cristina Bercia, Romeo Bercia - *Matematici speciale. Teorie si aplicatii*, Editura Printech, Bucuresti, 2010

9. Bridging the course content with the expectations of the epistemic community representatives, professional associations and employers representatives for the domain of the program

Fundamental discipline indispensable to any specialized approach.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final mark
10.4 Lectures	-Knowledge of basic theoretical notions -the ability of applying theoretical notions in problems	-a test in the middle of the semester (30%) -final exam (50%)	80%
10.5 Practical applications	- questions about basic notions and results teached in lectures - the ability of student to apply theoretical notions in problems	-a test (10%) -verification of the tasks (10%)	20%
10.6 Minimal performance standard			

-solving a first order differential equation and a secon order linear differential non-homogenous equation
-calculus of a residue of a function in a singular point and applying residue theorem
-determination of Laplace transformation of an original function

Date   Lecturer   Instructor for practical activities

14.11.2015   Dr. Petrescu-Nita Alina Claudia   Dr. Petrescu-Nita Alina Claudia
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Date of department approval   Director of Department,
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