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

COURSE DESCRIPTION

1. Program identification information

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

2. Course identification information

2.1 Name of the course				Mathematical analysis I			
2.2 Lecturer				Assoc. Prof. Dr. Irina Meghea			
2.3 Instructor for practical activities				Assoc. Prof. Dr. Irina Meghea			
2.4 Year of studies	I	2.5 Semester	I	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	4	3.2 course	3	3.3 practical activities	1
3.4 Total hours in the curricula, out of which	56	3.5 course	42	3.6 practical activities	14

Distribution of time	hours
Study according to the manual, course support, bibliography and hand notes	50
Supplemental documentation (library, electronic access resources, in the field, etc)	3
Preparation for practical activities, homeworks, essays, portfolios, etc.	20
Tutoring	0
Examinations	3
Other activities	0

3.7 Total hours of individual study	73
3.9 Total hours per semester	129
3. 10 Number of ECTS credit points	4

4. Prerequisites (if applicable)

4.1 curricular	Real section of high school or to know the introductory notions of mathematical analysis made in the 12th and 12th high school classes
4.2 competence-based	No appropriate

5. Requisites (if applicable)

5.1 for running the course	No appropriate
5.2 for running of the applications	No appropriate

6. Specific competences

Professional competences	Accumulation of knowledge on basic mathematical analysis need to the technical higher education, particularly notions need to provide a deeper understanding of specialty disciplines.
Transversal competences	Development skills to approach and solve any scientific problems by widening horizon and reasoning capacity conferred by mathematics on an early development stage of the student.

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

7.1 General objective of the course	Fundamental discipline need in approaching any specialty approaching. Presentation of main chapters of differential calculus and integral calculus with focus on further specialization.
4.2 Specific objectives	Ability to use the abstract reasoning and of calculus techniques with accent on its correct finalization, not only to have an idea about it, since an engineer should to solve a problem until the end.

8. Content

8.1 Lectures	Teaching techniques	Remarks
Sets and functions. Sequences of real and complex numbers	Teaching is based on presentations at the blackboard, in a permanent discussion with the students in order to involve them in clarification of notions and applications. Lecture materials are the notes and the presentations and three books of theory and solved and proposed problems.	3 hours
Series of real or complex numbers		3 hours
Sequences and series of functions		2 hours
Taylor formula. Taylor series. Power series. Fourier series		4 hours
Metric spaces. Fixed point theorems		3 hours
Particular subsets. Continuous maps.		2 hours
Partial derivatives. The differential		3 hours
Usage of differentiability in the study of functions. Local extrema. Implicit functions		5 hours

Generalized Riemann integrals. Integrals with parameter. Euler functions		3 hours
Multiple Riemann integrals. Double and triple integrals		5 hours
Curvilinear integrals. Differential forms. Circulation		3 hours
Surface integrals of the first and second kind. Flow		3 hours
Important operators. Integral formulae		3 hours

Bibliography
Bibliografie:

1. Constantin Meghea, Irina Meghea, "*Differential and integral calculus for mathematicians, physicists, chemists and engineers in ten volumes*", Old City Publishing, Philadelphia, Éditions des Archives Contemporaines, Paris, Vol. 1-3 - 2013, Vol. 4-8 - 2014, Vol. 9-10 - 2015

2. Constantin Meghea, Irina Meghea, "*Tratat de calcul diferenţial pentru învăţământul politehnic*", Vol. I – Editura Tehnică, Bucureşti, 1998, Vol. II – Editura Tehnică, Bucureşti, 2000, Vol. III – Printech 2002

3. Irina Meghea, "*Analiză matematică. Note de curs*", Editura Politehnica Press, in print

8.2 Practical applications	Teaching techniques	Remarks
Applications to sequences and series of numbers	Propose problems, explain the calculus methods and involve the students in discussions and the solutions of the exercises by work to the blackboard. Give homework with solved and proposed problems. Learning materials: three books which present and explain the theory, containing solved and proposed exercises.	2 hours
Applications to series of functions, Taylor formula, power series and Fourier series		2 hours
Applications to partial derivatives. Extremum problems		2 hours
Applications to generalized Riemann integrals and integrals with parameter		2 hours
Applications to multiple Riemann integrals		2 hours
Applications to curvilinear integrals of the first and second kind		2 hours
Applications to surface integrals of the first and second kind		2 hours

Bibliography

1. Constantin Meghea, Irina Meghea, "*Differential and integral calculus for mathematicians, physicists, chemists and engineers in ten volumes*", Old City Publishing, Philadelphia, Éditions des Archives Contemporaines, Paris, Vol. 1-3 - 2013, Vol. 4-8 -

2014, Vol. 9-10 – 2015
2. Irina Meghea, "*Analiză matematică*, *Aplicaţii*", Editura Politehnica Press, Bucureşti, 2012

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

As a result of modern evolution in sciences and techniques, in natural sciences and generally in any modeling of real phenomena, mathematics is compulsory. Contribution of this discipline should be considered as fundamental and have to be highlighted the way how the specialty study is necessary and how it complies with specific elements of training in this faculty.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final mark
10.4 Lectures	- to know the fundamental theoretical notions - the capacity to apply the theoretical knowledge in problems	- partial exam (weight 20%) established from the beginning of the semester - final exam (written), weight 50% The subjects to both verifications cover all the matter. - homework (weigh 10%)	80%
10.5 Practical applications	Starting from a summary of the notions and basic results, apply them in exercises and solve problems	- a verification test (10%) - a permanent quantification of the student activety at practical applications (10%)	20%
10.6 Minimal performance standard			

Date   Lecturer   Instructor for practical activities
12.10.2015   Assoc. Prof. Dr. Irina Meghea   assoc. Prof. Dr. Irina Meghea

Date of department approval   Director of Department,
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