Università degli Studi di L'Aquila - Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica

Course catalogue

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Programme of Module "Complex analysis (Istituzioni di Analisi Superiore mod. 2)"		
• Code: DT0027 • Type of course unit: Compulsory (Bachelor Degree in Mathematics curriculum Generale) • Level of course unit: Undergraduate Degrees • Semester: 2		
Number of ects credits: (Bachelor Degree in Mathematics) 6 (workload 150 hours)		
Teachers: Margherita Nolasco (nolasco@univaq.it)		
1	**Course objectives**	Knowledge of basic topics of complex analysis: elementary functions of complex variable, differentiation, integration and main theorems on analytic functions . Ability to use such knowledge in solving problems and exercises
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • Complex numbers. Sequences. Elementary functions of complex numbers. Limits, continuity. Differentiation. Analytic functions. Armonic functions • Contour integrals. Cauchy's Theorem. Cauchy's integral formula. Maximum modulus theorem. Liouville's theorem. Morera theorem. • Series representation of analytic functions. Taylor's theorem. Laurent's series and classification of singularities • Calculus of residues. The residue theorem. Application in evaluation of integrals on the real line and Principal Value. The logarithmic residue, Rouche's theorem. • Fourier transform for L^1 functions. Applications. Fourier transform for L^2 functions. Plancherel theorem. • Laplace transform and applications.
3	**Course prerequisites**	Knowledge of all topics treated the Mathematical Analysis courses in the first and second year : real function of real variables, limits, differentiation, integration; sequences and series of funcions; ordinary differential equations
4	**Teaching methodsand language**	theoretical lectures and exercises **Language**: English **Reference textbooks** • J.E. Marsden, M.J. Hoffman, ***Basic complex analysis***. Freeman New York. • W. Rudin, ***Real and complex analysis***. Mc Graw Hill.
5	**Assessment methods**	Written exam and oral exam