



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)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> • 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 functions; ordinary differential equations
4	Teaching methods and language	<p>theoretical lectures and exercises</p> <p>Language: English</p> <p>Reference textbooks</p> <ul style="list-style-type: none"> • J.E. Marsden, M.J. Hoffman, <i>Basic complex analysis</i>. Freeman New York. • W. Rudin, <i>Real and complex analysis</i>. Mc Graw Hill.
5	Assessment methods	Written exam and oral exam