

**Complex and Fourier analysis**

Code: 100103  
ECTS Credits: 6

Degree	Type	Year	Semester
2500149 Mathematics	OB	3	2

**Contact**

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**Use of languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Prerequisites**

To be able to follow this course it is convenient to know the differential calculus in several variables.

**Objectives and Contextualisation**

To understand and know how to use the fundamental concepts and results in Complex Analysis.

To understand and know how to use the basic concepts of the Fourier transform.

Deep understanding of the proofs of the most important results and the most common techniques

**Content**

1. Preliminaries. Complex numbers. Holomorphic functions and power series. Cauchy-Riemann equations.
2. Cauchy's Local Theory. Complex line integrals. Cauchy-Goursat theorem and the Cauchy local theorem. Cauchy's integral formula. Holomorphy and analyticity. Analytical prolongation. Cauchy inequalities, Liouville's theorem and fundamental theorem of algebra. The maximum principle
3. The residue theorem. Laurent series and isolated singularities. Residue theorem and applications. The argument principle and the Rouché theorem .
4. Harmonic functions and Fourier Transform. Holomorphic functions and harmonic functions on a disk. Fourier transform.