# Real and Complex Analysis

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

## In brief

- **Ametys Code:** N5AE02A
- **Open to exchange students:** No

# Presentation

## Objectives

At the end of this course, students will be able to manipulate complex numbers and functions, recognize holomorphic (analytic) and meromorphic functions, and apply the main results of complex analysis, in particular the residue theorem, to calculate integrals of meromorphic functions. A second objective is to introduce Laplace, Fourier, and Z-transforms. Contour integration techniques will be useful in courses on circuits, control systems, and numerical analysis.

## Description

This course comprises 10 lecture-tutorial sessions. During these sessions, we introduce: the complex plane C and the algebraic and geometric representations of a complex number; complex entire series and their convergence disk; complex functions and the concepts of limit, continuity, and differentiability on C; multiform complex functions and rank determinations; holomorphic functions and Cauchy-Riemann equations; meromorphic functions and Laurent series; complex curvilinear integrals and Jordan lemmas; residue calculus and Cauchy's and Residue Theorems, with applications to integral calculus and real series calculus.

## Pre-requisites

Basic concepts in real analysis (limits, real series, convergence, continuity, differentiability, entire series, etc.)