

**Tutor :**

Nuno Ricardo Barroso de Freitas

<https://www.icmat.es/miembros/nfreitas/>

**Method :**

Online meetings.

**Language :**

English, Spanish or Portuguese

**Project Title :**

Algebraic Number Theory

**Summary :**

The fundamental theorem of arithmetic states that any non-zero integer is expressible as a product of primes in a manner that is unique up to order of the factors and units (i.e., signs). Our first task will be to study to what extent unique factorization holds, or fails to hold, in number fields (i.e. finite extensions of  $\mathbb{Q}$ ). Afterwards, we will study a couple of other classical aspects of the theory which are essential tools for anyone interested in research in number theory. The specific topics to cover will depend on the student background and interests; these may include: finiteness of class groups, finite-generatedness of unit groups, the geometry of numbers, infinite Galois-theory, local fields, the the Kronecker-Weber Theorem, Dirichlet density theorem or local class field theory.