

# Differential Graded Categories (DG-categories)

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**Timetable:** 12 hours, Torre Archimede:

Prof. Bertrand Toën:

April 11, 2011, 15:00-17:00, Room 2BC/30

April 12, 2011, 15:00-17:00, Room 2BC/30

April 13, 2011, 15:00-17:00, Room 2BC/30

April 14, 2011, 15:00-17:00, Room 2BC/60

April 15, 2011, 9:30-12:30, Room 2BC/30

Prof. Gabriele Vezzosi: T.B.A. (one lesson after those of Prof. Toën).

**Examination and grading:** The exam would be oral. For more detailed informations please contact Prof. Silvana Bazzoni or Luisa Fiorot.

**SSD:** MAT/02 - MAT/03

**Aim:** The course provides an introduction to the theory of dg-categories which is a basic tool in some recent developments in algebra, non-commutative algebraic geometry and derived algebraic geometry. The main aim of this course is to give a self contained introduction to differential graded categories.

## Course contents:

Prof. Toën, would introduce the notions of dg-categories and quasi-equivalences. He would reserve a lecture to model category theory, and its applications to the study of dg-categories. He would introduce the homotopy category of dg-categories describing the set of morphisms in this homotopy category as the set of isomorphism classes of certain objects in a derived category of bi-modules. This result possesses several important consequences, such as the existence of localizations and of derived internal Homs for dg-categories. The very last part of this course would be devoted to present the notion of triangulated dg-categories, which is a refined version of the usual notion of triangulated categories, and to applications of DG-categories to K-theory.