The double trouble of the missing matter and energy in the Universe.

Teacher:Enzo Branchini (UNIGE)

The main goal of this course is to discus two important open issues of the Standard Cosmological Model.
Preferred prerequisite: Introductory course in Cosmology.

Program of the course:

The course presents the indirect evidence and discusses the prospects for Detection/characterization of two different 'dark' matter components of our Universe.

Part 1 is dedicated to the so-called missing baryons problem.
The baryon budget at different cosmic epochs.
Observational evidences for the missing baryons.
Whereabouts of cosmic baryons: a theoretical perspective.
The Warm Hot Intergalactic Medium
The search for cosmic baryons.
State of the art, open issues and future perspectives.

Part 2 is dedicated to the Dark Energy [DE] problem and to the possibility to constrain its nature from the observed distribution of galaxies in large suveys of galaxies

Cosmological evidences for DE.
Primary cosmological probes to DE: galaxy clustering and weak lensing.
Spectroscopic galaxy surveys for clustering analyses.
Photometric galaxy surveys for weak lensing analysis.
Current observational constraints.
Observational landscape: ongoing and future surveys.
Astrophysical targets, observations and results.