

Observational Cosmology

Instructor	Dr. Giovanni Covone (Università "Federico II", giovanni.covone@unina.it)
Credits (planned)	3
Planned hours	18
Planned schedule	To be discussed with the students
Prerequisites	Basic concepts in Astrophysics and General Relativity will be introduced in the course when necessary.
Description	<p>The goal of the course is to introduce the students to the modern observational cosmology. In the first part of the course, key concepts will be derived from first principles. We will then introduce the basic concepts and techniques to interpret the data from the modern cosmological surveys (CMB, large scale distribution, weak gravitational lensing). Focus of the second part of the course is on the probes of dark matter and dark energy, and the tests of the general relativity in the cosmological context.</p> <p>Syllabus:</p> <p>Basics of general relativistic cosmology. Cosmological world models.</p> <p>Hierarchical formation of cosmic structures. The Press–Schechter theory. Role of dark energy and dark matter in cosmic structures formation. Nature of dark matter: Warm versus cold dark matter.</p> <p>Gravitational lensing. Cosmological distance and the distance scale. Weak gravitational lensing surveys as cosmological probes. Observational probes of the dark matter. Large scale distribution of galaxies and galaxy clusters. Present and future surveys: KIDS, Planck, EUCLID, SKA. Tests of general relativity in the cosmological context.</p> <p>Textbooks: J. Peacock, "Cosmological Physics" H. Mo, F. van den Bosch, S. White, "Galaxy Formation and Evolution".</p>