

PhD course in Physics, Astrophysics, and Applied Physics - Università degli Studi di Milano
PhD cycle 40 (2024-2025)

All lectures will be given in English.

Course title	Advance Topics in Astrophysics and Plasma Physics - Cosmology
Teacher in charge of the course	Maino Davide
List of the teachers of the course <i>[surname/name; affiliation; e-mail]</i>	Maino Davide, University of Milan, davide.maino@unimi.it
Training objectives	The aim of the course is to provide the students with the physics and mathematics required to describe the primordial universe. Specifically the course covers the inflationary paradigm and the relevant impact on what we can observe today with modern instruments. In introduction to primordial nucleosynthesis is given together with the evolution of small density perturbations that give rise to the total intensity pattern of the Cosmic Microwave Background Radiation. A brief introduction to primordial gravitational waves is also given.
Prerequisites <i>[please insert details and also state whether the course has advanced contents suitable for students with prior knowledge of the topics or is also suitable for students without prior knowledge]</i>	The course is self-contained and, although touching advanced topics, it does not require nothing more than the usual knowledge provided during the master physics program.
Detailed course program	<ol style="list-style-type: none">1. The background metric and the smooth universe2. Issue with Big Bang model and introduction to inflationary3. Inflationary evolution of perturbation and impact on the space-time metric4. CMB anisotropies and temperature angular power spectrum5. Gravitational wave and polarisation CMB B-modes6. Data analysis issue and techniques.
Examination modalities	Seminar by the student on selected course topic
Preliminary schedule <i>[please indicate the weeks when the lectures will be given]</i>	January-February-March 2025