

**Course title:**

Cosmic Distances

**Duration [number of hours]: 12**

**PhD Program [MERC/MPS/SPACE]: SPACE**

**Name and Contact Details of Unit Organizer:**

Prof. Massimo Della Valle  
INAF-Capodimonte, Naples  
massimo.dellavalle@inaf.it

**Course Description [max 150 words]:**

The course is addressed to students intending to deepen their knowledge on measuring the cosmic distances and how to use them to evaluate the expansion rate of the Universe.

**Syllabus [itemized list of course topics]:**

We discuss the modern techniques to measure the Astronomical Distances, namely:

- i) Trigonometric parallaxes
- ii) Period-Luminosity Color Relation for Cepheids
- iii) Classical Novae, Globular Clusters and Planetary Nebula luminosity function
- iv) Tully-Fisher relationship and Surface Brightness fluctuations
- v) Supernovae-Ia and the measure of the Hubble constant
- vi) Gamma-ray Bursts and the measure of the cosmological parameters

**Assessment [form of assessment, e.g. final written/oral exam, solutions of problems during the course, final project to be handed-in etc.]:**

Solutions of problems at the end of the lectures.

**Suggested reading and online resources:**

The field is rapidly changing, so I would suggest some classical books/papers such as:

1. MEASURING THE UNIVERSE, THE COSMOLOGICAL DISTANCE LADDER - Stephen Webb - Editors : Springer & Praxis Publishing - 1999
2. 1. Stellar Candles for the Extragalactic Distance Scale; on [Lecture Notes in Physics](#) Springer-Verlag Berlin, 2003, nr. 635, Heidelberg, Editors: Alloin, Danielle, Gieren, Wolfgang
3. A Critical Review of Selected Techniques for Measuring Extragalactic Distances:  
<http://articles.adsabs.harvard.edu/pdf/1992PASP..104..599J>

which describes the methodologies. For the last results , I'll provide the .pdf files from slides lectures.