SSM
Scuola Superiore Meridionale

Course title: *Observational Astronomy: Telescopes, Observables, Methods*

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

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

Name and Contact details of unit organizer(s):

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

This focused course introduces the fundamental concepts and techniques of observational astronomy, from measuring astronomical quantities to acquiring and analysing data. Once some basic concepts, like astronomical distances, coordinate systems, time measurement, and the main observables used to describe celestial sources are introduced, the course presents the principles and characteristics of ground-based optical and space telescopes, including observational limitations, sources of contamination, and future facilities. It then introduces the main methods for obtaining astronomical data through imaging and photometry, covering detectors, data reduction, and calibration, followed by spectroscopy, its physical foundations, the origin of different types of spectra, and their applications to the study of astrophysical processes and objects.

Syllabus:

Introduction & definitions
- *Distances & Scales*
- *Coordinates' systems*
- *Measuring time*
- *Observables: flux, magnitudes, colors*

Telescopes
- Types of telescopes
- Ground-based optical telescopes
- Space telescopes
- Radio telescopes
- Detectors
- Pollutions
- Future facilities

How to get data - Imaging & Spectroscopy
- Photometry
- Spectroscopy: definition
- Electromagnetic radiation & astrophysical processes
- Kinds of spectra
- Origin of different kinds of spectra
- Data reduction & calibration
- Applications in astrophysics

Assessment: To be defined

Suggested reading and online resources:

Lectures slides

Proposed literature references: to be provided