

Level: bachelor			
Course title: Instruments and Observations in Astronomy			
Status: optional			
ECTS: 6			
Requirements:			
Learning objectives Acquiring general and specific knowledge of instruments and techniques of astrophysical observations.			
Learning outcomes After the course, the student should have developed the following: <ul style="list-style-type: none"> - General competences: Student can use different astronomical software, search online databases, and knows how to plot different data and results, and write the report on specific practical project. - Specific course competences: Student understands the main properties of astronomical instruments and techniques observations, knows how to prepare and conduct observations on an optical telescope, and performs basic data reduction. 			
Syllabus <i>Theoretical instruction</i> Basics of acquiring astrophysical data. Properties of different observational data (photons, gravitational waves, cosmic rays, neutrino). Influence of Earth atmosphere to astronomical data. Properties of telescope optical elements. Telescope objectives, diffraction, and limiting angular resolution. Magnification, field of view, eyepiece. Telescope optical schemes. Telescope aberrations. Different telescope mounts. Properties of optical filters and classification. Spectrometers and basic properties, spectral resolution and light gathering power. Different design of spectrometers. Basics of optical prism and diffraction grating. Detectors. Main characteristics of detectors. Eye. Photographic emulsion. Photoelements. Photomultipliers. CCD cameras. Other telescopes and detectors (gamma and x-rays, infrared, radio, neutrino and gravitational telescopes). Concept of virtual observatories. <i>Practical instruction</i> Five practical tutorials in the preparation of observations and data reduction. Final project – CCD photometry. Observations at the 1m class telescope, and data reduction with IRAF. 1. C.R. Kitchin “Astrophysical Techniques“, 2008, CRC Press 2. S.B. Howell “Handbook of CCD Astronomy“, 2000, Cambridge University Press			
Weekly teaching load			Other:
Lectures: 5	Exercises: 3	Other forms of teaching: 1+1	