

Study Programme: Bachelor Academic Studies in Physics
Course Unit Title: Instruments and Observations in Astronomy
Course Unit Code: F18IAP
Name of Lecturer(s): Assistant Professor Dragana Ilic
Type and Level of Studies: Bachelor Academic Degree
Course Status (compulsory/elective): Elective
Semester (winter/summer): Summer
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 6
Prerequisites: None
<p>Course Aims:</p> <p>Acquiring general and specific knowledge of instruments and techniques of astrophysical observations.</p>
<p>Learning Outcomes:</p> <p>After the course, the student should have developed the following:</p> <ul style="list-style-type: none"> - General competences: <p>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.</p> <ul style="list-style-type: none"> - Specific course competences: <p>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.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>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.</p> <p><i>Practice</i></p> <p>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.</p>
Required Reading:

1. C.R. Kitchin “Astrophysical Techniques“, CRC Press, 2008.
2. S.B. Howell “Handbook of CCD Astronomy“, Cambridge University Press, 2000.

Weekly Contact Hours:	Lectures: 3	Practical work: 2
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Teaching Methods:

Lectures, practical work and seminars.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	
Practical work	15	oral exam	45
Preliminary exam(s)		
Seminar(s)	30		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.