

Study programmes: Astronomy and Astrophysics - PhD Studies			
Course name: Modern instruments and techniques in astronomical observations			
Lecturers: Dragana Ilić, Milica Vučetić			
Status: Optional			
ECTS: 9			
Attendance prerequisites: None			
Course aims: Teaching students the development and application of the state of the art scientific and professional achievements in observational methods and data processing in astronomy and qualifying them for creative scientific work.			
Course outcome: After completing the course, students have advanced knowledge about modern astronomical instruments and methods and are capable to perform independent scientific research.			
Course content: Introduction: general theory, basic equations and concepts in astronomical observations; Design of instruments and methods for optical; Specifics of observation in other wavelengths (high-energy and low-energy radiation) and information (cosmic rays, neutrinos, gravitational waves); New directions in development of optical astronomy (adaptive optics; modern instruments and detectors); Concepts of time-domain astronomy; Design and operations of modern telescopes and large sky surveys; New directions in satellite astronomy.			
Practical work on the analysis of design and operations of current observing facilities and missions (SDSS - Sloan Digital Sky Survey, ZTF - Zwicky Transient Facility, LSST - Large Survey in Space and Time; JWST - James Webb Space Telescope).			
Literature:			
1. P. Bourke, Image and data processing, 2004, ESO Special report 2006. 2. K Seidelman et al., Explanatory supplement of astronomical almanac, 1992 3. S. Šegan, Astronomske efemeride, 2006.			
Number of hours: 10	Lectures: 4	Tutorials: 6	
Teaching and learning methods:			
Frontal, group, practical work			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	20	Written exam	
Exercises / Tutorials	30	Oral exam	20
Colloquia			
Essay / Project	30		