



ASTRONOMY	
Enrollment year	2019/2020
Academic year	2020/2021
Regulations	DM270
Academic discipline	FIS/05 (ASTRONOMY AND ASTROPHYSICS)
Department	DEPARTMENT OF PHYSICS
Course	
Curriculum	Didattica e storia della fisica
Year of study	2°
Period	1st semester (05/10/2020 - 20/01/2021)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	DE LUCA ANDREA (titolare) - 6 ECTS
Prerequisites	Basic courses in Physics; Introductory Astronomy is suggested.
Learning outcomes	Learning of the main aspects of astronomy in the high energy range of the electromagnetic spectrum, with particular emphasis in the soft X-ray energy range: working principles of modern telescopes; properties of different classes of high energy sources, starting from the most recent observational results.
Course contents	Multiwavelength astronomy. Interaction between radiation and matter. Detectors for X-ray astronomy. Optics for X-ray astronomy. Experiments and space missions devoted to X-ray astronomy. Phenomenology of cosmic X-ray sources: low-mass stars; high-mass stars; supernovae; supernova remnants; isolated neutron stars; accreting binary systems; active galactic nuclei; clusters of galaxies; cosmic X-ray background radiation; gamma-ray bursts. Introduction to soft X-ray data analysis (hands-on sessions): the ESA/XMM-Newton observatory and its data;

	imaging analysis; time series analysis; spectroscopy.
Teaching methods	Lectures. Hands-on sessions (8 hours) will also be organised, devoted to an introduction to analysis of data collected by the ESA/XMM-Newton space observatory.
Reccomended or required readings	<p>F.D. Seward, P.A. Charles, Exploring the X-ray universe, Cambridge University Press, 2010</p> <p>A. Siemiginowska, K. Arnaud, Handbook of X-ray astronomy, Cambridge University Press</p> <p>W. R. Leo, Techniques for Nuclear and Particle Physics Experiment. Springer-Verlag Berlin</p> <p>M. Longair, High energy astrophysics 3rd edition, Cambridge University Press, 2011</p> <p>Review papers and notes given by the teacher</p>
Assessment methods	Oral examination, including a 15-minute presentation of a topic chosen by the student.
Further information	Oral examination, including a 15-minute presentation of a topic chosen by the student.
Sustainable development goals - Agenda 2030	\$lbl_legenda_sviluppo_sostenibile