



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Fisica e Chimica - Emilio Segrè		
ACADEMIC YEAR	2022/2023		
BACHELOR'S DEGREE (BSC)	PHYSICS		
SUBJECT	ASTRONOMY		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50163-Astrofisico, geofisico e spaziale		
CODE	01501		
SCIENTIFIC SECTOR(S)	FIS/05		
HEAD PROFESSOR(S)	REALE FABIO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	94		
COURSE ACTIVITY (Hrs)	56		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<b>REALE FABIO</b> Tuesday 12:30 14:30 Ufficio, Via Archirafi 36 Thursday 12:30 14:30 Ufficio, Via Archirafi 36		

DOCENTE: Prof. FABIO REALE

PREREQUISITES	Basic physics. Basic calculus
LEARNING OUTCOMES	<p>Knowledge and understanding Students learn basic Astronomy and Astrophysics, of their physical methods and the related tools for observations and interpretation.</p> <p>Applying knowledge and understanding With exercises, discussions and derivations during lessons, students apply what they have learnt to simple, but important, cases well selected within basic Astronomy and the related physical phenomena.</p> <p>Making judgements Students are asked to make evaluations and quantitative derivations based on physics, to tackle questions with an independent approach and to evaluate the applicable astronomical or physical method pertinent to the problem. Students may also be asked to tackle an entirely new problem with an inquisitive approach.</p> <p>Communication skills Students during exercises and discussions during the lessons are asked to comment some aspects of Astronomy stemming from the discussion and to expose them in their own words. The student can write a short essay on a specific astronomical subject, to be written according to scientific journals format thus giving the opportunity to learn scientific writing. The essay will be exposed and defended during the exam thus giving the opportunity to evaluate the student's communication skills.</p> <p>Learning skills Students will use teacher's notes, textbooks in English, some material available in the web to be used for study. Students are also encouraged to look for other textbooks and informations on the web (to be handled with caution and an inquisitive and critical mind).</p>
ASSESSMENT METHODS	<p>Final exam will be an oral one. Oral exam is a discussion on astronomical phenomena, on the related physical laws, on the derivation of physical conditions found in various astronomical objects; the student may be asked to solve simple computations or solution of related physical problems. The exam aims to verify the student's knowledge of Astronomy, her/his ability to apply it, the proper use of astronomical terminology and verbiage and her/his ability to expose the subject clearly and plainly. The student has the option to write a short essay, on a subject jointly selected with the teacher, according to a format and a style (both mandatory) identical to those of a scientific paper. Essays will have to be submitted at least three working days before the start of the exam session so as to allow an adequate evaluation. The essay will be presented orally and discussed as part of the oral examination; its content and presentation will be evaluated in the same way as the rest of the oral exam. The essay, if presented, will contribute to one third of the total and the final grade will be the result of the weighted average between the evaluation of the essay and that of the rest of the exam. The final grade, will be given according to the following conditions:</p> <ul style="list-style-type: none"><li>a) Basic knowledge of astronomical phenomenology, of related physical laws and limited ability to apply them autonomously to new cases, sufficient ability to analyze the phenomena proposed and to expose the conceptual path followed to reach the result (grade 18-21);</li><li>b) Good knowledge of astronomical phenomenology, of related physical laws; good capability to apply them autonomously to new cases, to analyze the phenomena proposed and to expose the conceptual path followed to reach the result (grade 22-25);</li><li>c) Deep knowledge of astronomical phenomenology, of related physical laws; good capability to apply them autonomously and promptly to new cases (albeit with some occasional uncertainty and/or with a twisted path); rather good ability to analyze the phenomena proposed and to expose the conceptual path followed to reach the result (voto 26-28);</li><li>d) Deep and broad knowledge of astronomical phenomenology, of related physical laws; very good capability to apply them autonomously and promptly to new cases; very good ability to analyze the phenomena proposed and to expose the conceptual path followed to reach the result; topmost grade may be given also (not only) under the evidence of autonomous contributions or studies (grade 29-30 cum Laude).</li></ul>
EDUCATIONAL OBJECTIVES	Learning basic Astronomy.
TEACHING METHODS	The subject is presented in the second semester of the third year of the CdL in Physical Sciences. Didactics is based on lessons which often include quantitative estimates and calculations. Students are strongly encouraged to

	join and, sometimes, are involved directly in the numerical estimates o in the discussions.
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>Testo base - Basic textbook Karttunen, Kroger, Oja, Poutanen, Donner – Fundamental Astronomy – Springer Verlag, 2016, ISBN-10 3662530449</p> <p>Testi di Consultazione/Additional textbooks Zeilik, M. - Gregory, S.A. - Introductory Astronomy and Astrophysics - Saunders Golden Sunburst Series Carroll, B.W. , Ostlie, D.A. : An Introduction to Modern Astrophysics – Addison Wesley Ferrari, A. - Stelle, galassie e universo. Fondamenti di astrofisica. - Springer Verlag Pasachoff, J.M., Filippenko, A. - The Cosmos: Astronomy in the New Millennium - Cambridge University Press Shu, F.H. – Physical Universe: An Introduction to Astronomy – University Science Books Note del docente</p>

## SYLLABUS

Hrs	Frontal teaching
2	Celestial sphere, coordinate systems, positional astronomy. Telescopes and other instruments for astronomical observations in various spectral bands
3	Definition of intensity, flux and other features of radiation. Emission and absorption of radiation and its propagation in a medium.
4	Solar system, planets and minor bodies. Extrasolar planets.
2	Stellar spectra and stellar classification
4	Structure and evolution of stars
3	Binary stars
2	Interstellar medium
2	Structure of the Galaxy, spiral arms.
2	Stellar populations
3	Classification and features of galaxies
3	Cluster of galaxies. Active galaxies.
2	Cosmology
Hrs	Practice
2	Exercises on photometry and spectroscopy
4	Mechanisms of emission and absorption
4	Exercises on the solar system and on methods for extrasolar planets detection.
4	Stellar spectra, stellar classification,HR diagram, luminosity classes.
4	Nuclear reaction and other physical processes inside stars.
3	Exercises on binary stars and stellar populations.
3	Extragalactic astronomy and cosmology