



Bachelor in Physics

(Academic Year 2026-27)

Astrophysics	Code	800507	year	3rd	Sem.	1º
Module	Fundamental Physics	Topic	General Astrophysics	character	Optional	

	Total	Theory	Exercises
ECTS credits:	6	4	2
Semester hours	45	30	15

Learning Objectives (according to the Degree's Verification Document)
• Know the basic techniques of astronomical observation. • Be able to interpret the basic observational parameters. • Understand the different scales and structures in the Universe • Know the main physical properties of stars, galaxies, the interstellar medium, star clusters and galaxies, etc. • Be able to understand the foundations of the standard cosmological model and the observational evidence that supports it.
Brief description of contents
Introduction to Astrophysics (astronomical observation), stars (the Sun, parameters, stellar evolution), planets (of the Solar System, extrasolar), galaxies and cosmology (cosmology, structure, external galaxies, the Milky Way)
Prerequisites
Knowledge of General Physics.

Coordinator	Shane O'Sullivan		Department:	FTA
	Office:	04.224.0	e-mail	s.p.osullivan@ucm.es

Theory/Problems – Schedule and Teaching Staff								
Group	Lecture Room	Day	Time	Professor	Period/Dates	Hours	T/E	Dept.
B	19	Mo, Fr	13:30 – 15:00	Shane O'Sullivan	Full term	30	T/P	FTA
				Patricia Sánchez Blázquez		15	P	FTA

Office hours				
Group	Professor	Schedule	E-mail	Location
B	O'Sullivan, Shane Patrick	Mo, Fr: 15:30-17:30	shanepos@ucm.es	04.224.0
	Patricia Sánchez Blázquez	M: 15:30-16:30 J: 15:30-17:50 Online: X: 15:30-16:30 V:10:30-12:30	psanchezblazquez@ucm.es	00.321.0

* 3 h tutorials during the working week through email, virtual campus, etc.

SYLLABUS
I. Introduction 1. Astronomical Observation II. Stars 2. Stellar Parameters 3. The Sun 4. Star Formation 5. Stellar Evolution 6. Final Stages of Stars III. Planets 7. Solar System 8. Exoplanets IV. Galaxies and Cosmology 9. Introduction to Cosmology 10. Large-Scale Structure of the Universe 11. The Nature of Galaxies 12. Galaxy Evolution 13. Active Galaxies 14. The Milky Way

Bibliography
• “Universe”, by R. A. Freedman, R.M. Geller y W.J. Kauffmann III, Ed. W.H. Freeman & Co., 2013. • “An Introduction to modern astrophysics”, by B. W. Carroll y D. A. Ostlie, Ed. Addison- Wesley, 2007. • “Fundamental Astronomy”, by H. Karttunen et al., Ed. Springer, 2007.
Online Resources
Online resources will be provided through the virtual campus.
Methodology

Teaching is delivered through lectures focusing on the theoretical aspects of the field, and resolution of quantitative exercises.

Evaluation criteria		
Exams	Weight:	70%
Final mark for the Exams section: N_{Exam}, between 0 and 10. A written exam with theoretical questions and quantitative exercises about the material covered in the course.		
Other activities	Weight:	30%
Resolution of questionnaires and exercises through the virtual campus and/or in-class exercises. The final mark for this section will be $N_{\text{OtherActiv}}$ and will range from 0 to 10.		
Final mark		
Final mark: $C_{\text{Final}} = \max (0.7N_{\text{Exam}} + 0.3N_{\text{OtherActiv}} , N_{\text{Exam}})$ Minimum final exam mark to apply weighting: $N_{\text{Exam}} \geq 4$. If $N_{\text{Exam}} < 4$: the final mark of the course will be $C_{\text{Final}} = N_{\text{Exam}}$ The final mark criteria, as well as the grading for other activities, will be maintained in the exam of the extraordinary call.		