# Bachelor in Physics
## (Academic Year 2022-23)

| **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 (history, astronomical observation), planets (of the Solar System, extrasolar), stars (the Sun, stellar parameters, stellar evolution), galaxies (the Milky Way, external galaxies), the Universe (structure, cosmology).

**Prerequisites**

Knowledge of General Physics.



| **Coordinator:** | Jesús Gallego Maestro | | **Department:** | FTA |
|---|---|---|---|---|
| | **Office:** | Office. 314.0 | **e-mail** | j.gallego@ucm.es |



**Lecturers and Seminars – Lecturers and Schedule**

| Group | Classroom | Day | Schedule | Lecturer | hours | Department |
|---|---|---|---|---|---|---|
| **B** | M3 | Mon, Fri | 13:30–15:00 | Patricia Sánchez-Blázquez, | 45 | FTA |

**Office hours**

| Group | Professor | Schedule | e-mail | Location |
|---|---|---|---|---|
| **B** | Patricia Sánchez-Blázquez | L, X: 15.30h-17.30h + 2 horas on line | psanchezblazquez@ucm.es | office 321, ground floor, West wing |

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

| SYLLABUS |
|---|
| **I. Introduction**<br>1. History of Astronomy<br>2. Astronomical Observation<br>**II. Stars**<br>3. The Sun<br>**4. The solar system**<br>5. Stellar parameters<br>6. Star Formation<br>**7. Exoplanets**<br>8. Stellar Evolution<br>9. The death of stars<br>**III. Galaxies**<br>10. The Milky Way<br>11. The Nature of Galaxies<br>12. Dynamics and Evolution of Galaxies.<br>13. Active Galaxies<br>**IV. The Universe**<br>14. The Structure of the Universe<br>15. Cosmology<br>**Appendix:** Celestial Sphere |

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

| Methodology |
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| Theory lectures, using a power-point presentation, will be delivered on campus. |

| Evaluation criteria | | |
|---|---|---|
| **Exams** | **Weight:** | 70% |
| There will be a final exam, consisting of brief questions and exercises that may include some questions from the online tests (see other assessment activities). | | |
| **Other activities** | **Weight:** | 30% |
| Online tests and exercises available to the students on the virtual campus. | | |
| **Final mark** | | |
| The final mark will be calculated as: NFinal = 0.7NExam+ 0.3NOtherActiv , where NExam and NOtherActiv represent the grades (from 0 to 10) obtained in the Exam and Other Activities respectively. | | |