

68364 - Stellar astrophysics

Syllabus Information

Academic year: 2024/25

Subject: 68364 - Stellar astrophysics

Faculty / School: 100 - Facultad de Ciencias

Degree: 628 - Master's Degree in Physics of the Universe: Cosmology, Astrophysics, Particles and Astroparticles

ECTS: 6.0

Year: 01

Semester: First semester

Subject type: Optional

Module:

1. General information

The subject is part of the **Astrophysics** subject together with **Extragalactic Astrophysics** and **Astrophysics**.

It provides students with an understanding of the basic equations of stellar structure, as well as of the early stellar evolution and post main-sequence evolution. They will also learn about the main features of compact objects.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the Agenda 2030 of the United Nations: 4. Quality education; 8. Decent work and economic growth; 9. Industry, innovation and infrastructures.

2. Learning results

Upon completion of this subject, the student will be able to:

- Understand the birth of stars and the physical processes involved.
- Understand the physics of the interior of stars and how it determines their evolution depending on their mass.
- Understand the physics of stellar atmospheres and know how to interpret the spectra of stars.
- Know the final phases of stellar evolution, as well as the variable and explosive phases in the life of stars.

3. Syllabus

1. Properties of stars: stellar masses and radii. Classification of the stars. Physical interpretation of the stellar spectrum. Color-magnitude diagrams.
2. Stellar structure: basic equations. Properties of stellar matter. Simple star models.
3. Stellar evolution: early stellar evolution. Evolution after the main sequence. Final explosions and collapse.
4. Compact objects: White dwarfs. Neutron stars. Black holes, pulsating stars and stellar rotation.

4. Academic activities

1. Participation in and attendance to lectures.
2. Case analysis, sharing and debate on the contents of the subject.
3. Solving problems related to the contents of the subject.
4. Carrying out observational practices.
5. Writing and submission of works.
6. Production and oral presentation of works.
7. Face-to-face or telematic tutoring.
8. Individual study.
9. Written or oral assessment tests.
10. Discussions in discussion forum.

5. Assessment system

The student must demonstrate that they have achieved the expected learning results by means of the following assessment activities:

- Assessment of reports and written work: 20%.

- Assessment of case analysis, problem solving, questions and other activities 20%.
- Assessment of oral presentations of work: 10%.
- Assessment of the evaluation tests 30%.
- Assessment of the work carried out in the observatory 20%.

The final grade will be obtained according to the percentage assigned to each assessment activity. In order to pass the subject, this final grade must be equal to or higher than 5.

The subject has been designed for students who attend the classroom and lab classes and perform the assessment activities described above. However, there will also be an assessment test for those students who have not taken the assessment activities or have not passed them.

This global assessment test will take place on the dates established by the Faculty of Sciences and will consist of solving problems related to the topics covered in the subject.

6. Sustainable Development Goals

4 - Quality Education