SUBJECT TEACHING GUIDE

276 - Extragalactic Astrophysics

Master's Degree in Particle Physics and the Cosmos

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	Master's Degree in Particle Physics and the Cosmos			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline	SPECIALIZATION IN PHYSICS OF THE COSMOS Specialisation Module				
Course unit title and code	276 - Extragalactic Astrophysics				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web	https://aulavirtual.unican.es/				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. FISICA MODERNA
Name of lecturer	AMALIA CORRAL RAMOS
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Other lecturers	ANA ACEBRON MUÑOZ

3.1 LEARNING OUTCOMES
- Know the content of galaxies, and understand the relationship between morphology and physical properties.
- Learn about procedures to determine properties of galaxies.
- Understand the formation and evolution of galaxies.
- Differentiate between normal and active galaxies, recognising the galaxies with active nucleus and understanding the physics involved.
- Be able to obtain information on a specific topic in the literature, analyse data, perform calculations, draw conclusions and present the corresponding report.
- Understand stellar evolution and know how to determine cosmological distances.

4. OBJECTIVES

Learn procedures for obtaining information in Astrophysics.

Understand the formation and evolution of stars and galaxies, collisions and galaxy mergers, formation of clusters, rotation curves, central orbital motion of stars and gas, and gravitational lensing effect in different scales.

Know the structure, formation and evolution of galaxies with different morphologies, groups and galaxy clusters.

That the student acquires a wide knowledge of the Physics and properties of active galactic nuclei.

Solve typical problems in Extragalactic Astrophysics. Use public databases to analyze galaxies and galaxy clusters.

6. SUBJECT PROGRAM

CONTENTS	
1	Radiation detection
2	Astronomical observations and catalogues.
3	Galaxies
4	Active galactic nuclei (AGNs)
5	Clusters of galaxies

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Follow-up of face-to-face activities, and deliverables assigned in class.	Others	No	Yes	30,00
Assessment of lab reports.	Work	No	Yes	50,00
Evaluation of oral presentations.	Others	No	No	20,00
TOTAL				100,00

Observations

In the lab reports and written works, the inclusion of text copied directly from the Internet or other sources, without having been cited explicitly, will be considered plagiarism. The UC evaluation rules will be applied in such cases. Although there is no minimum grade for the reports, written works and oral presentations, in order to pass the subject, the student must submit reports corresponding to all laboratory sessions and to all his/her work assignments, and must give the oral presentations planned. During the lab sessions and execution of works, the student can consult his/her doubts to the corresponding lecturer, who will give him/her the appropriate indications. After the submission of each report/work, this will be graded and commented by the lecturer. In case a student does not pass the subject during the continuous evaluation process, he/she can present revised reports/works at the end of the semester. In this case, since the revision is guided by a lecturer (it would be based on comments about the initial reports/works), the maximum mark of each report/work would be of 5.0 out of 10.

Observations for part-time students

A lab and presentations schedule will be set in order to allow the attendance of all the students enrolled (full and part time). We will also facilitate learning and follow-up of the subject by part-time students, through the availability of notes, problems, etc. in the virtual classroom (UC Moodle platform).

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Galaxies in the Universe, L.S. Sparke & J.S. Gallagher (2007) Cambridge University Press

Galactic Astronomy, J. Binney & M. Merrifield (1998) Princeton University Press

Extragalactic Astronomy and Cosmology - An introduction, P. Schneider (2016) Springer