

Degree	Type	Year	Semester
4313861 High Energy Physics, Astrophysics and Cosmology	OB	0	2

## Contact

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## External teachers

Margarida Hernanz

## Use of languages

Principal working language: english (eng)

## Prerequisites

It is recommended to have followed the courses of the first semester, and to follow, in parallel, the courses of the second one.

## Objectives and Contextualisation

To initiate students into research activities.

To incorporate students into a research group during the time of the master thesis.

To perform a research work in order to acquire the research skills needed for developing a research career.

## Skills

- Carry out academic work independently using bibliography and data bases and also working with other professionals.
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Continue the learning process, to a large extent autonomously
- Devise strategies for analysis, synthesis and communication to transmit notions of high energy physics, astrophysics and cosmology in educational and outreach environments.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Plan and carry out theoretical, experimental or observational research in the fields of high energy physics, astrophysics or cosmology using the appropriate methods, bringing innovative and competitive proposals, and report about the results
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use correct spoken and written English.
- Use the adequate software, programming languages and computer packages to research problems related to high energy physics, astrophysics and cosmology.
- Work in a group and take on responsibility, interacting professionally and constructively with other people with complete respect for their rights.

- Work independently, take initiatives and be able to organise work in order to achieve results and plan and carry out a project.

## Learning outcomes

1. Achieve a overall view of the Masters dissertation.
2. Be capable of carrying out an original Masters Dissertation project.
3. Begin research in a new area.
4. Carry out a bibliographical work in collaboration with other scientists for the Masters dissertation.
5. Complete and present the Masters dissertation within the established deadline.
6. Join an pre-existing working group.
7. Learn the necessary programming languages for the research to be carried out.
8. Make a public oral presentation of the Masters dissertation that is clear, concise and coherent.
9. Present the Masters dissertation in English and give an oral defence, also in English.
10. Undertake the Masters dissertation project independently with supervision.
11. Write a clear, concise and coherent report for the Masters dissertation.

## Content

The master thesis will consist in a research work, preferably original, in the fields of Particle Physics, Astrophysics or Cosmology, developed in a pre-existing research group, preferably, at UAB, IFAE or ICE-CSIC.

The research work must be done individually.

The student and the supervisor will agree the research lines.

In case the supervisor is not UAB personnel belonging to the Physics Department, the student will find a tutor from the Physics Department.

## Methodology

The master thesis will consist in a written report and an oral defence.

The written report will include 50 pages maximum including figures. The report will contain a cover page with the title and the names of the student and supervisor, abstract, introduction, methodology, results, conclusions, and bibliography. The report will be written in English.

The oral defence will consist in an oral presentation of 30 minutes maximum of the work performed in front of an evaluation committee. The members of the committee can put questions at the end. The oral presentation will be given in English.

## Activities

Title	Hours	ECTS	Learning outcomes
<b>Type: Supervised</b>			
Master Thesis supervision	60	2.4	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
<b>Type: Autonomous</b>			
Master Thesis autonomous work	254	10.16	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

## Evaluation

The master thesis (written report and oral defence) will be evaluated by an evaluation committee of 3 members.

The master thesis will be evaluated in the calls of July or September.

The master thesis written reports will be given to the master coordinator in electronic and paper forms one week in advance before the date established for the oral defences.

### **Evaluation activities**

Title	Weighting	Hours	ECTS	Learning outcomes
Master Thesis oral defence	30%	1	0.04	2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Master Thesis written report	70%	60	2.4	1, 2, 3, 4, 5, 6, 7, 9, 10, 11

### **Bibliography**

The bibliography will be suggested to the student by the supervisor in each case.

The student will perform his/her own bibliographic research.