UAB
Universitat Autònoma de Barcelona

Master's Dissertation

Code: 44083
ECTS Credits: 12

2024/2025

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

Contact

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Teachers

Álvaro Sánchez Monge

Teaching groups languages

You can view this information at the end of this document.

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

Competences

- Carry out academic work independently using bibliography (principally in English) and databases, and also collaborating 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 English correctly both orally and in writing.
- Use the adequate software, programming languages and computer packages to research problems related to high energy physics, astrophysics and cosmology.
- Work autonomously, have personal initiative, be able to organise oneself to achieve results, and to plan and execute a project.
- Work in a group and take on responsibility, interacting professionally and constructively with other people with complete respect for their rights.

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 the master's degree dissertation by producing a bibliographical work, and in collaboration with other scientists.
5. Finish and present the master's degree dissertation within the pre-established deadline.
6. Learn the necessary programming languages for the research to be carried out.
7. Make a public oral presentation of the Masters dissertation that is clear, concise and coherent.
8. Present the master's degree dissertation written in English and defend it orally, also in English.
9. Undertake the Masters dissertation project independently with supervision.
10. Work in small groups to solve problems of data analysis.
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 Departament.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Supervised			
Master Thesis supervision	25	1	1, 6, 3, 9, 7, 11, 2
Type: Autonomous			
Master Thesis autonomous work	275	11	1, 6, 3, 9, 7, 11, 2

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

The written report has two modalities. Upon agreement with the supervisor, the student will select between:

- Thesis-like report: 50 pages maximum document 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.
- Research paper-like report: 2-colum 15 pages maximum length document, excluding appendeces, emulating a publishable research article written in English. A LaTeX template for such document can be found in the following links depending on your itinerary:
    - High Energy physics: Physics letter B
    - Astrophysics and Cosmology: Monthly Notices of the Royal Astronomical Society

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.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Master Thesis	100%	0	0	5, 1, 6, 3, 9, 4, 7, 11, 8, 2, 10

The master thesis (written report and oral defence) willl be evaluated by an evaluation committee of 2 - 3 members. An inform to the supervisor will be requested.

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.

This subject/module does not foresee the single assessment system.

Bibliography

The biblography for the master thesis will be suggested to the student by the supervisor in each case.

The student will perform his/her own bibliographic research.

Software

Non used.

Language list

Information on the teaching languages can be checked on the CONTENTS section of the guide.