University Master's in Physics of Condensed Matter and Biological Systems

Academic Offer Course 2019/2020

Information

The Master's degree in Physics of Condensed Matter and Biological Systems has a marked multidisciplinary nature. Its ultimate objective is to train future doctorate students and technicians in excellence within the fields of knowledge linked to the programme.

The Master's will offer its students two areas of specialization: Nanophysics and Biophysics. Within the Nanophysics specialization, the student will acquire a broad spectrum of basic knowledge and methodological and technological skills related to the study and understanding of the properties of solids and liquids, as well as in the area of Nanoscience. Within the Biophysics specialization, students will acquire knowledge related to the physical principles of biological processes and the physiochemical techniques employed in its analysis, with an emphasis on both theoretical and experimental methods. Nevertheless the student can obtain the Master degree without specialization if not enough credits are assigned to one of both specializations.

Compulsory: 15 ECTS (Standard compulsory module) + 12 ECTS (Compulsory specialization module)

Electives: 12 ECTS

Final Master's Project: 21 ECTS

Specializations:

- Nanophysics
- Biophysics

Modules:

- A **standard compulsory module,** in which students will familiarize themselves with the basic experimental techniques used in the field of the Physics of Condensed Matter and Biological Systems, with the basic principles of the Physical Chemistry processes of this type of systems and with cross-cutting abilities and professional skills (15 ECTS).

- Two **compulsory modules,** one per specialization. In the module of compulsory knowledge in Nanophysics, students will learn the necessary basic knowledge, whichever their ultimate area of specialization, on Solid State and Surface Physics and on Statistical Physics that are not currently taught in degree courses. In the compulsory knowledge module on Biophysics, students will learn the specific skills in

Physics, Mathematics and Cell and Molecular Biology (depending on their previous studies) important for them to broaden their understanding and quantitative analysis of biological systems (12 ECTS).

- One **specialized knowledge module** that will be structured from a wide range of elective subjects, specific to each study plan (12 ECTS).

- One final module made up of a tutor-led piece of practical work (**Final Master's Project**) (21 ECTS).

Syllabus

Code	Subject	Semester	Type	ECTS	Module	Specialization
32666	Experimental techniques in Nanophysics and Biophysics	1	Compulsory	6	1	Standard
33118	Physical Foundations	1	Compulsory	6	1	Standard
32668	Professional Skills and Abilities	1	Compulsory	3	1	Standard
32669	Advanced Statistical Physics	1	Elective (*)	6	2	Nanophysics
32670	Interactions and low-dimensional systems in condensed matter	1	Elective (*)	6	2	Nanophysics
32671	Theoretical Methods in Biophysics	1	Elective (*)	6	2	Biophysics
32672	Experimental and Computational Methods in Biophysics	1	Elective (*)	6	2	Biophysics
32674	Physics of Low Temperatures	2	Elective	4	3	Nanophysics

Code	Subject	Semester	Type	ECTS	Module	Specialization
32675	Nanophotonics and Quantum Optics	2	Elective	4	3	Nanophysics
32676	Quantum Field Theory in Condensed Matter	2	Elective	4	3	Nanophysics
32677	Surface Nanoscience	2	Elective	4	3	Nanophysics
33119	Bioinformatics	2	Elective	4	3	Biophysics
32683	Neuroscience	2	Elective	4	3	Biophysics
32684	Biology of Systems	2	Elective	4	3	Biophysics
32678	Computational Methods in Physics of Condensed Matter and Biomolecules	2	Elective	4	3	Nanophysics/ Biophysics
32679	Tunnel-effect and Force Microscopies	2	Elective	4	3	Nanophysics/ Biophysics
32680	Image Processing and Analysis	2	Elective	4	3	Nanophysics/ Biophysics
32673	Final Master's Project	Annual	Compulsory	21	4	Standard

(*) Compulsory Specialization Subject

Modules:

1. Standard compulsory module
2. Compulsory specialization module
3. Elective module
4. Final Master's Project

In accordance with the agreements reached by the UAM Postgraduate Studies Commission, elective subjects with less than 5 registered students may not run. The students affected will be advised of this decision so that they can choose and register for other subjects.

Those specializations that do not have a minimum number of applications before the end of the first term of the admission procedure might not be taught. It will be informed before the second term.

The offer of optional subjects could suffer minor changes before the start of lessons for reasons of adjustments in Master's teaching organization, in which case, it will be properly announced.