



Degree in Physics

$$\frac{\Delta y}{\Delta x} = f'(x) + d, d \rightarrow 0$$

$$S = \frac{gt^2}{2}$$

$$\int x^2 \ln x dx$$



UNIVERSIDAD
DE
CÓRDOBA



Faculty of Science
University of Córdoba

¿Why study **Physics** at the **University of Córdoba**?

Physics deals with the observation, understanding and prediction of natural phenomena and the behavior of artificial systems. It deals with profound questions about the nature of the universe as well as with practical issues related to the environment and technology. The ideas and techniques stemming from Physics give rise to developments in related disciplines such as Chemistry, Engineering, Information Technology, Materials Science, Mathematics, Medicine, Biophysics & Life Sciences, Meteorology and Statistics. The tools originally used to address physical problems have found application in other branches of science; such as particle accelerators, created to study the elemental nature of matter and are now used in materials science, biology and medicine.

It may be complex to summarize the challenges that physicists face nowadays but, as an example, we can stress the manufacture of new materials, which possess interesting properties for industrial matters, or in biomedicine, with the development of new drugs, diagnosis or radiation treatments. Basic questions related to our knowledge of the the universe and its matter, as well as their interactions and fundamental constituents, also remain open.

The professors of the Degree of Physics at the University of Córdoba carry out research in various fields of this area of knowledge, which allows them to keep abreast of the latest developments in Physics and to transfer them in a timely manner to our undergraduate courses.

If you feel an interest in what is mentioned here... Physics is your choice.



By following our **Degree in Physics** you will obtain:

- A general knowledge of the fundamental subjects of Physics, both at theoretical and experimental level, without discarding a greater emphasis on some specific subjects.
- A set of competences to be applied in further studies in various scientific or technological areas or in a professional environment.
- The ability to present and argue their ideas, both in academic and non-academic environments.
- The capability to gather information on a subject, analyse it, extract the most relevant information and, as a result, make reasoned judgments on the subject and propose possible solutions.
- A drive for entrepreneurial competences, based on training in the basic subjects learnt, on learning about current issues (environment, energy sources, etc.) and on contact with the business world through external internships.

Curriculum

Our Degree in Physics belongs to the science branch, and has a duration of 4 years and 240 ECTS credits. This degree qualifies students to study and analyse physical phenomena and their laws, as well as for research and teaching, both theoretical and experimental, of the features of nature. Practical skills will be acquired through the completion of a large number of seminars and laboratory practices. The specific competences of our Degree in Physics are aimed at the most general and fundamental aspects of Physics, by developing students' abilities to experiment, model, estimate and calculate, as well as their application of acquired knowledge in their professional practice in company.

General Curriculum Structure

Subject category	ECTS
Basic training	60
Compulsory	150
Options	24
Final dissertation	6
TOTAL	240

Full Curriculum

FIRST TERM

YEAR 1

Subject	ECTS
Foundations of Physics 1	6
Mathematical Analysis 1	6
Linear Algebra and Geometry 1	6
Chemistry	6
Scientific Coding	6

2º CUATRIMESTRE

Subject	ECTS
Foundations of Physics 2	6
Mathematical Analysis 2	6
Linear Algebra and Geometry 2	6
Experimental Techniques in Physics	6
Mathematical Methodology 1	6

YEAR 2

Subject	ECTS
Mechanics and Waves 1	6
Thermodynamics 1	6
Mathematical Methodology 2	6
Astrophysics and Cosmology	6
Option 1	6

Subject	ECTS
Mechanics and Waves 2	6
Thermodynamics 2	6
Mathematical Methodology 3	6
Numerical Methodology and Simulation	6
Optativa 2	6

YEAR 3

Subject	ECTS
Electromagnetism 1	6
Optics 1	6
Quantum Physics 1	6
Statistical Physics	6
Mechanics of Continuous Media	6

Subject	ECTS
Electromagnetism 2	6
Optics 2	6
Quantum Physics 2	6
Electrical Circuits	6
Projects	6

YEAR 4

Subject	ECTS
Solid State Physics	6
Quantum Mechanics	6
Classical Electrodynamics	6
Atomic and Molecular	6
Option 3	6

Subject	ECTS
Final dissertation	6
Physical Electronics	6
Nuclear and Particle Physics	6
Electromagnetic Wave Propagation	6
Option 4	6



Students will develop their abilities to quickly acquire new knowledge, to work in a team and to make themselves understood, all of which are highly valued in the job market



Options

Subject	ECTS
Economics and Business Management	6
Advanced Scientific Coding	6
Meteorology and Climatology	6
Digital Electronics	6
Ionizing Radiation	6
History of Physics	6
Optics Extension	6
Microcontrollers	6
Advanced Numerical Methods	6
Electronic Instrumentation	6
Foundations of Spectroscopy	6
Plasma Physics	6
Company internships	6



The challenges facing today's physicists will help improve the world in which we live



External internships

External internships in private companies and public institutions can be carried out as curricular internships, i.e. as an optional subject in the fourth year and second semester, and also as extracurricular internships, which can be included in the European Diploma Supplement (Europass). All the same, they represent an added value to the student's curriculum vitae and their first work experience. The Faculty of Science of the University of Córdoba has agreements with over 400 companies that can offer internships positions for our students.

Student mobility

Complementary training in other universities facilitates employability and foreign language skills as they reinforces respect for diversity and the ability to understand other cultures. The Faculty of Science participates in international mobility programmes, such as Erasmus+, PIMA, UCO Global, with destinations in all continents, as well as national mobility (SICUE).

Where is the Degree in Physics taught?

The Degree in Physics is taught in the Faculty of Science, located in the Rabanales University Campus. It can be reached by train (it takes around 5 minutes from Córdoba central station), local buses (peripheral lines "E" and "Rabanales") and bicycle lane. The Campus has a variety of facilities and resources that facilitate the academic and social aspects of university life.

Professional **profile** and **labour integration**

Physics studies enable students to practice the profession in multiple fields:

Teaching

One of the main activities of physicists is the training of future physicists, teaching subjects related to Physics, not only within Physics degrees, but also in other scientific studies, in a variety of Engineering schools, as well as in secondary and further education schooling, including vocational training.

Research

This is a fundamental activity for physicists, in the case of our country this is achieved mainly in the public sector, universities and public research organizations where most of the technological innovation is carried out. In businesses, most of the research in which physicists are involved is related to the fields of information technology, quantum engineering and data mining.

Business, industry and services

In most businesses we find activities that depend on scientific knowledge, in areas such as manufacturr, renewable energies, information technology and communications, health and safety or quality. Physicists can occupy positions related to project management activities, performing technical work, in addition to management in sales and marketing departments, for scientific and technical advice roles.

Health

Medical physics deals with providing the scientific basis for the use of new diagnostic and therapeutic technologies. Physicists also perform specific healthcare tasks in hospitals, in specialised positions as the one of radiophysicist, such as planning treatments with ionizing radiation, control of radiology equipment, design and control of radiological facilities, control of personnel and areas exposed to radiation, among others.

Freelancing and entrepreneurship

Graduates in Physics will be able to set up their own business, either by signing and approving commissioned projects or by creating their own company.



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Address

Campus Universitario de Rabanales
Ctra. Madrid-Cádiz Km. 396.
14014 Córdoba

Contact

Phone: 957 218 582
Email: decanato.ciencias@uco.es
Student information line: 957 212 404

Web

Degree: www.uco.es/ciencias/es/grados/gr-fisica
School: www.uco.es/ciencias
University: www.uco.es