

Physics, Mathematics & Computer Science

The University of Cantabria offers a catalogue of courses taught in English that are integrated in different thematic programs.

The courses are open to exchange students and it is possible to combine them with other regular courses in Spanish.

For non-native students a B2 level of English is recommended.

Unit courses (6 ECTS)

PHYSICS

Advanced Experimental Techniques

G79 - Fall / G1775 - Spring

A First contact with advanced instrumentation and techniques is carried out through a set of experiments in different Fields of physics: optics and photonic, nuclear and particle physics and material science. These experiments are mostly performed in research labs, under supervision of an expert in each of the topics.

Advanced Computation

G80 - Fall

The course teaches how to use high level modelling tools to represent object oriented computing problems and organize the realization of a solution paying attention to the phases of the development processes available, the estimation of the computational complexity, and the resolution of the binary representation used. It is highly practice oriented and proposes a physics simulation problem to be solved with java. Finally the students will explore how to manage different volumes of information and automated forms to present resulting data.

Particle Physics

G1777 - Spring

An overview of theoretical and experimental particle Physics will be given. The main experimental techniques, particle detectors and accelerators, will be reviewed. Examples of collider data-analysis and particle detection with solid state detectors will be treated in the lab. Basic concepts of QCD and weak interaction as gauge theories will be given, as well as an overview of the current problems of the Standard Model and the possible theories going beyond.

Astronomy

G1776 - Spring

The course will cover the basics of the current knowledge in Astronomy. A global vision of our understanding of the Universe, the scales involved and the Forces driving its evolution will be given. Topics include the life of the stars or black hole Formation, among others. This will be complemented with the description of the main observational techniques and experimental evidences that lead to the current picture we have of the Universe.

Experimental Optics

G1778 - Spring

The course will teach mainly through experiments on some of the Fundamentals and techniques in optics. Experiments may include geometrical optics, photometry, dispersion, polarization, interference, diffraction, optical coherence and digital image processing. The student will learn how to use a variety of instruments, how to obtain and process the measurements and eventually, how to extract the information contained in the results.

MATHEMATICS

Advanced Probability

G1894 - Fall

The learning outcomes for this subject include the acquired knowledge and management of advanced procedures in Probability Calculation with emphasis on limit theorems and some models of continuous time stochastic processes that include Brownian motion and, with examples of their application.

Advanced Statistics

G1903 - Fall

The students attending this course will acquire skills to perform simple simulations and understand the management of most common techniques of multivariate analysis, including Discriminant Analysis, Cluster Analysis, Principal Components Analysis, Factorial Analysis and Multidimensional Scaling.

Measure Theory

G1902 - Spring

The basic theory of abstract integration will be developed in this course, both for positive measurable functions and with complex values. The basic theorems of convergence will be studied and compared with some related theorems already known by the student. Topics include the most common sigma-algebras and their completion, the relationship between positive linear functions and their representation as integrals, the relationships between measurable and continuous functions, and the general L_p spaces.



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COMPUTER SCIENCE

Computer Animation and Video Games

G1749 - Fall

Fundamentals of design and creation of video games. The animation process step by step. Graphical techniques for game development. Organized in teams, students propose and implement a project demonstrating a novel technology for gaming.

System and Network Security and Assurance

G1828 - Spring

Computer security is critical in today's technology-driven world. With growing cyber threats, understanding how to protect data and systems is a vital skill. This introductory course in computer security provides the essential knowledge to defend against attacks like malware, phishing, and unauthorized access. You will learn about encryption, firewalls, secure coding practices, and network protection. Whether you are interested in creating secure software or seek to become a better systems administrator, this course equips you with the tools to understand and mitigate risks. You will face security challenges from both perspectives, complement theoretical lessons with a hands-on approach.

Natural Language Processing

G687 - Spring

This course offers a comprehensive introduction to Natural Language Processing, in which the students will get acquainted with linguistic terminology and learn about algorithms, techniques and methods most commonly used for processing and analysing text data, including tokenization, parsing, sentiment analysis, and language modelling. By the end of the course, students will be able to apply NLP techniques (using the NLTK framework or implementing it in Python) to solve real-world problems in areas like information retrieval, text classification, spelling correction or automated text generation.

Courses in other disciplines

A complete list of courses taught in English can be found in the following link:
<http://web.unican.es/en/Studying/academic-offer/courses-taught-in-english>

Of special interest are the courses dealing with Spanish Language, History and Culture:

- **Spanish History and Culture. G1806 - Spring**
- **Spanish Language. G1807 - Spring**
- **European Culture and Civilization. G1808 - Spring**
- **Cross-Cultural Spanish Arts. G1809 - Spring**
- **Contemporary Spain (1939-2009). Politics, Society and Culture. G1810 - Spring**
- **Discovering Spanish Landscapes. G1811 - Spring**
- **An Introduction to Spanish Literature and Cinema G2010 - Spring**
- **Prehistoric European Art. G1504 - Spring**

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