

Course: Physics and technology in the 21st century

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Language of Instruction: English

Syllabus:

This course intends to approach the main concepts of Classical and Quantum Physics, from a conceptual and qualitative point of view, without entering into mathematical developments. The course also pretends to connect the main physical concepts with some technological challenges of the 21st century in the fields of electronics, big data, energy or biomedical technology. In particular, I would like to show the importance of Physics and, in particular, of Quantum Physics, in our daily lives.

To introduce the different physical concepts, we will follow a historical perspective, connecting the different discoveries with the life of the scientists who carried them out and with the social impact they have had.

Contents:

- 1.- Classical physics: Mechanics, Electromagnetism and Optics.
- 2.- Introduction to special relativity: the physics of light
- 3.- Quantum physics and the Structure of Matter.
- 4.- Nuclear physics and radioactivity: nuclear energy, nuclear medicine and dating
- 5.- Solid State Physics: graphene and other smart materials
- 6.- Size matters: nanophysics and nanomedicine

References

Notes provided in class
Information from Webpages provided in class

Evaluation: I consider two options to be discussed in order to meet the University criteria and the goals of the students

- (A) Final Exam (50%) and short questions in class (50%)
- (B) Final Exam (100%)

Main Course Reading Materials:

- George Gamow. Biography of Physics.
- George Gamow. Thirty years that shook Physics.

