



Physics

Syllabus

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| Course code: | 1571 |
| Number of ECTS credits: | 6 |
| Semester: | 1nd (September-December) |
| Prerequisites: | None |
| Recommended components: | You should be familiar with basic calculus. |
| Language of instruction: | Spanish (students are allowed to ask questions and write homeworks and exams in English) |

Course description

This is an introductory course on Physics that provides an introduction to Classical Mechanics. It covers the basic concepts of Kinematics, Newtonian Laws applied to one and many particles and central forces.

Course contents

- I. Introduction
Experimental method, standards and units, uncertainty and significant figures
- II. Kinematics.
Position, velocity and speed. The acceleration vector, parallel and perpendicular components of acceleration. Velocity and position by integration. Relative motion: position, velocity and acceleration (including rotational effects).
- III. Newton's Laws of Motion.
Newton's First, Second and Third Laws. Dynamics of particles. Frictional forces.
- IV. Work and Energy.
Work and Kinetic energy with constant and varying forces. Power. Potential energy (gravitational and elastic). Conservative and non-conservative forces. Energy diagrams. Harmonic oscillator
- V. Systems of Particles.
Center of mass. Energy and linear momentum. Conservation Laws. Collisions.
- VI. Rotation of Rigid Bodies.
Angular momentum. Energy in rotational motion. Torque and angular acceleration. Work and power in rotational motion. Conservation of angular momentum.
- VII. Central Forces.
Newton's law of Gravitation. The motion of Satellites. Kepler's Law of the motion of planets.

References

Main texts

1. Young, Hugh D., Roger A. Freedman, and A. Lewis Ford. *Sears and Zemansky's University Physics: with Modern Physics. 12th edition*; Addison Wesley, 2007.

Supplementary references

1. P.A. Tipler and G. Mosca, *Physics for Scientists and Engineers (6th edition)*; Freeman and Company, 2008.
2. Raymond A. Serway and John W. Jewett. *Physics for Scientists and Engineers*, 2013
3. D.C. Giancoli, *Physics for Scientists & Engineers with Modern Physics (4th Edition)* Addison-Wesley, 2008