

## SUBJECT TEACHING GUIDE

G31 - Basic Experimental Physics I: Movement, Force, Astronomy

Double Degree in Physics and Mathematics  
Degree in Physics

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Physics			Type and Year	Core. Year 1 Core. Year 1
Faculty	Faculty of Sciences				
Discipline	Subject Area: Basic Experimental Physics Basic Module				
Course unit title and code	G31 - Basic Experimental Physics I: Movement, Force, Astronomy				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	<a href="https://moodle.unican.es/course/view.php?id=6670">https://moodle.unican.es/course/view.php?id=6670</a>				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

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Other lecturers	JOSE JULIO GÜEMEZ LEDESMA RAFAEL VALIENTE BARROSO SILVIA MATEOS IBAÑEZ

### 3.1 LEARNING OUTCOMES

- Appreciate Physics like nature explanation.
- To interpret different physical phenomena using the theoretical concepts of the subject (mechanics).
- Identify the relevant points of a physical phenomena , and to analyze them within the proposed model.
- To know the instruments and measurements techniques
- To perform experiments in Physics in which the student can observe basic physical concepts.
- To acquire data and to analyze the experimental results to extract the appropriate conclusions , taking in account the precision of the instruments.
- To perform mathematical operations like integration , differentiation, derivation...appropriate to the level of the course, that let the student to obtain qualitative solutions in reasonable times
- Deal with concepts like particle, reference sisters, energy, moment, conservation laws...
- To understand basic mechanical laws.
- Understand the rigid solid, and to be able to solve kinematic and dynamical problems about it.
- To understand the historical way to obtain some physical laws.
- To apply the gravitation law.

### 4. OBJECTIVES

- To reckon the experimental nature of Physics.
- To observe in a critical way a variety of physical phenomena and to interpret these using the theoretical concepts of the subject.
- To perform experiments in Physics in which the student is able to solve the problems that appear the experimental set -up. To acquire data and to analyze the experimental results to extract the appropriate conclusions.
- To be able to elaborate a written report, well structured, showing a synthesis of the developed experimental work, the results in tables and graphics, a proper analysis, and the obtained conclusions.
- To solve quantitative and qualitative problems

6. COURSE ORGANIZATION	
CONTENTS	
1	Measurement in Physics. Systems of units. Unity conversion. Dimensions of physical magnitudes. Dimensional analysis. Estimations. Orders of magnitude. Significant figures.
2	Movement in one dimension. Displacement, velocity and acceleration vectors. Movement with constant acceleration. Kinematic equations. Movement in two and three dimensions.
3	Newton 's laws. Force and mass. Applications
4	first exam
5	Work and energy. Work done by a force. Conservative forces. Potential energy. Conservation of mechanical energy.
6	Systems of particles. Center of mass. Linear momentum and its conservation. Colisions.
7	2nd exam
8	Rotation. Torque. Angular momentum. Moments of inertia. Fundamental equation of the rotation dynamics. Conservation of angular momentum.
9	Third exam
10	Newton's law of Gravitation. Gravitatory field and potential. Astronomy: an historical introduction. Some astronomical measurements. Gravity and its impact on Universe. Solar system: Kepler' laws. Newtonian interpretation. Orbits: energy, angular momentum and excentricity.
11	Experiment 1
12	Experiment 2
13	Experiment
14	Experiment 4
15	final exam
16	demonstration1
17	demonstration 2
18	demonstration 3
19	Practical seminar
20	Practical seminar
21	Seminar

### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
1st exam	Written exam	No	Yes	10,00
2nd exam	Written exam	No	Yes	15,00
Third exam	Written exam	No	Yes	15,00
Lab reports	Work	No	Yes	30,00
Final exam	Written exam	Yes	Yes	30,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
1st exam, 2nd and Third exam if failed, can be catch up on with the final exam.				
Lab reports have to be delivered within one week.				
<b>Observations for part-time students</b>				
to establish with the professor				

### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

#### BASIC

Autores: Tipler, Paul Allen y Mosca, Gene.

Título: Física para la ciencia y la tecnología

Edición: 6ª ed.

Editorial: Barcelona : Reverté, [2010]

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