SUBJECT TEACHING GUIDE

G62 - Physics Laboratory I

Double Degree in Physics and Mathematics
Degree in Physics

Academic year 2020-2021

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Physics			Type and Year	Compulsory. Year 3 Compulsory. Year 2
Faculty	Faculty of Sciences				
Discipline	Subject Area: Physics Laboratories Central Module				
Course unit title and code	G62 - Physics Laboratory I				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. FISICA APLICADA
Name of lecturer	RAFAEL VALIENTE BARROSO
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Office	Facultad de Ciencias. Planta: + 0. LABORATORIO - ESTEREOLOGIA (0079)
Other lecturers	JOSE JULIO GÜEMEZ LEDESMA JOSE IGNACIO ESPESO MARTINEZ JONATAN PIEDRA GOMEZ

3.1 LEARNING OUTCOMES
- The students will perform experiments related to Mechanics (Study of spring-coupled masses, Resonant phenomena, forced and dumped oscillators, Central forces, Aerodynamics, Rolling with/without slipping) and Thermodynamics (Determination of Thermodynamic coefficients of liquids and gasses, Black-body radiation, Stefan-Boltzmann law, Newton's law of cooling, Enthalpy of vaporization of liquids, etc.). They should contrast the obtained results with physical models based on a theoretical framework.
- To develop the ability to work with orders of magnitud and estimations. All the experiments are designed to make estimations and orders of magnitud of the results from a physical model before performing the experiment. It allows the student to identify potential mistakes from measuring apparatus or fails of the physical model.
- The student will analyze data through the comparison to physical models by software like KaleidaGraph, Origin or Igor. They will compare the obtained results with the corresponding physical models through least squared fitting for obtaining information of involved parameters.
- Students will develop the ability to communicate the results of experimental work through scientific reports with the structure of a scientific paper and oral presentations through PowerPoint, Keynote or Prezi programs.

4. OBJECTIVES
Application of the scientific method. Scientific rigor, critic observation and modelization capabilities.
Technical knowledge and measure apparatus to allow the optimization of experimental results with the available material . To perform estimations, to work with approximations and orders of magnitud.
To develop the ability to express ideas in oral and writing, enhancing the summarize ability and information structure through oral presentations and elaborating scientific reports.

6. COURSE ORGANIZATION	
CONTENTS	
1	Block 1. Experiments related to Classical Mechanics and Fluids. Demonstrations explaining the key concepts will be performed by the teacher. Oscillations and resonant phenomena. Normal modes. Rigid body dynamics. Moment of inertia, Collisions. Orbit in central potential. Hydrodynamics. Bernouilli and Coanda effects.
2	Bloc 2. Experiments related to Thermodynamics. Demonstrations explaining the key concepts will be performed by the teacher on Thermodynamics , Calorimetry, phase transitions and radiation. Thermometric magnitudes. Types of thermometers: thermocouple and thermistor and their calibration.Gas thermometer at constant volume. Piezothermic coefficient. Phase transitions. Vapor pressure. Clausius-Clapeyron equation. Thermal radiation. Cooling was. Other thermodynamic phenomena.
3	Each student will carry out an oral presentation of one of the experiments he/she performed during the course (10% of the final mark).
4	Each student will prepare a video presentation, assisted by a Power Point type presentation, on a scientific paper published in journals of the American Journal of Physics, Physics Education, Chemical Education, which usually present undergraduate-level experiments. These articles will be related to the content of the subject.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
15 minutos Video Presentation about a scientific paper will be evaluated by at least two lectures. These videoclips would be available for the other students, which is, in our opinion, an excellent pedagogical tool.	Work	Yes	Yes	10,00
Three experimental questions related to some of the 12 experiments performed during the course. 30% of the final mark. Students should obtain a mark equal or greater than 3/10.	Written exam	Yes	Yes	30,00
Students should make an oral presentation (about 10 min.) of one of the experiments performed, which will be chosen by the teacher among those experiments with experiments report. Although it is only 10% of the final mark, it is mandatory to pass the cour	Others	No	Yes	10,00
Three experimental questions related to some of the 12 experiments performed during the course. 30% of the final mark. Students should obtain a mark equal or greater than 3/10.	Written exam	Yes	No	0,00
Students will perform 12 experiments, 5 related to Classical Mechanics and 7 to Thermodynamics. They should present at least 5 experimental reports (2 related to Classical Mechanics and 3 to Thermodynamics). These will contribute to the 50% of the final m	Others	Yes	No	50,00
TOTAL				100,00

Observations

Taking into account the experimental character of the subject, to carry out the lab experiments is mandatory. It will be evaluated through the corresponding Lab Reports (50% of total grade).
The Video Presentations have a recoverable character and will be evaluated by at least two lecturers. In addition, to pass the subject the student must obtain a minimum grade of 3/10 in the Written Exam and a total grade equal or greater than 5. An oral presentation of one of the performed experiments is also mandatory (10% of total grade).
Those students do not pass the subject in the 'Convocatoria Ordinaria' ((February Examination Session) will be able to retake their exams in the 'Convocatoria Extraordinaria' (September Examination Session) according to the following points:
- The student will keep the grade of these parts that have been passed.
- They should deliver the necessary Lab Reports to have a minimum grade of 5 (only for those students that performed the lab experiments) (50% of total grade).
- They will perform the Extraordinary Exam (September Examination Session) to obtain a minimum grade of 3 (30% of total grade).
- The percentage and grade of Video Presentations will be kept (10% of total grade).

Observations for part-time students

Students with part-time enrollment should contact the professor responsible of the Lab at the beginning of the academic year.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
M. W. Zemansky y R. H. Dittman, Calor y Termodinámica, 6ª ed., McGraw-Hill, México D.F. (1985) Texto básico en el tipo de termodinámica fenomenológica que se trabaja en el laboratorio
M. Alonso y E. J. Finn, Física vol. I Mecánica, Fondo Educativo Interamericano, México (1970)
P. A. Tipler y G. Mosca, Física, Ed. Reverté (en cualquiera de sus ediciones)
Guías de los experimentos de laboratorio disponibles al comienzo del curso a través de la plataforma Moodle.