SUBJECT TEACHING GUIDE

G425 - PYSICS 1

Degree in Mechanical Engineering

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Degree in Mechanical Engineering			Type and Year	Core. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Physics Basic Training Module				
Course unit title and code	G425 - PYSICS 1				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS DE LA TIERRA Y FISICA DE LA MATERIA CONDENSADA
Name of lecturer	JOSE JAVIER SANDONIS RUIZ
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Other lecturers	VIRGINIA MONTESEGURO PADRON

3.1 LEARNING OUTCOMES

- - To know precisely fundamental concepts and models associated to the different parts of the subject .
- - To write properly the concepts and to know how to establish comparisons about of the relative importance and the role of the models in addressing a physical problem. To write correctly a judgment on the obtained results .
- - To solve numerical problems associated to the contents of subject using different units and basic mathematical tools .
- - To be able to verbally make judgments about practical situations related to the contents of the subject .

4. OBJECTIVES

To know the basic concepts and variables associated with mechanics. To be able to solve analytically and / or numerically practical cases associated with these concepts.
To appreciate the physics as a way to understand the Nature. To be able to verbally make judgments about practical situations related to the contents of the subject.
To identify the key points of a physical phenomenon. To know how to analyse the physical phenomenon experimentally considering the proposed model and the mathematical methods needed and provide a quantitative result testable with experience.
Analyse and present the results taking into account the accuracy of the instruments used.

6. COURSE ORGANIZATION

	CONTENTS
1	1.-VECTORS: Vectors and scalars. Laws of vectors algebra. Coordinate systems and components of vectors. Scalar and vector products. Derivatives and integrals of a vector. Torque of a vector. Systems with many vectors. Nabla operator, gradient, divergence and rotational.
2	2. PARTICLE KINEMATIC. Motion in one dimension: speed and acceleration. Movement in two and three dimensions: speed and acceleration, motion with constant acceleration, intrinsic components of acceleration, projectile motion, motion in a circle.
3	3. RELATIVE MOVEMENT: Speed and acceleration relative. Relative motion of uniform translation, Galileo transformations. Relative motion of uniform rotation. Relative motion in the Earth.
4	4. PARTICLE DYNAMICS: Newton's laws, force concept and linear momentum conservation principle. Fundamental forces. Types of forces: contact forces, elastic, frictional. Dependent speed friction forces. Fictitious forces. Angular momentum. Central forces and Kepler's laws.
5	5. WORK AND ENERGY: Work made by a force. Power. Kinetic energy. Conservative forces and potential energy. Force and potential gradient. Conservation of mechanical energy and non-conservative forces. Potential energy curves. Time dependent forces and impulse. Collisions
6	6. SIMPLE ARMONIC MOTION: kinetic and potential energies. Examples: simple pendulum and vertical spring. Damped and forced oscillations, resonance. Composition af harmonic motions.
7	7. DYNAMICS OF PARTICLE SYSTEMS: Properties of internal forces. Application of Newton's laws to a particle system, linear and angular momentum. Center of mass of a particle system: definition and movement. Kinetic energy of a particle system. Energy conservation.
8	8. DYNAMICS OF RIGID SOLID: translational and rotational movement. Angular momentum and moment of inertia. Calculating moments of inertia. Steiner theorem. Equation of motion for rotation of a solid. Rotational kinetic energy. Physical pendulum. Gyroscopes and precession.
9	9. EQUILIBRIUM: Equilibrium of a particle and of a rigid solid. Equilibrium of a rigid body submitted to two or three forces. Conditions for equilibrium. Solving rigid-body equilibrium problems.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Partial written exam (theory and problems) 20%	Written exam	No	Yes	20,00
Partial written exam (theory and problems) 20%	Written exam	No	Yes	20,00
Partial written exam (theory and problems) 20%	Written exam	Yes	Yes	40,00
Laboratory work 20%	Laboratory evaluation	No	No	20,00
TOTAL				100,00

Observations

In the extraordinary call, there will be a final exam with the same characteristics as in the ordinary call, with the final grade being the weighted average of said exam with laboratory practices.

ADAPTATION IN CASE OF NOT BEING ABLE TO PERFORM A PRESENTIAL EVALUATION
In this case, the evaluation will maintain the same criteria and percentages described in this section. The tools of the Moodle platform will be used to carry out and deliver the evaluation activities. When these activities are synchronous, identity supervision and control will be carried out by videoconference.

Observations for part-time students

The student enrolled part-time may choose either the assessment method described above in this teaching guide or to take only the Final Exam. In the latter case, the weight of said exam will be 100%.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Serway - Jewet "Física" 3ª Ed. Thomson
P. A.Tipler "Física" vol 1 - 4ª Ed. Reverté