

Academic Year: ( 2022 / 2023 )

Review date: 05-09-2022

Department assigned to the subject: Department of Physics

Coordinating teacher: RAMIREZ JIMENEZ, RAFAEL

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Kinematics of the particle: velocity and acceleration. Rectilinear and curvilinear motion. Tangential and normal components of the acceleration.
2. Dynamics of the particle: forces. Newton's laws. Friction and Tension. Energy and work. Impulse and linear momentum. Conservative forces. Potential energy. Central forces. Angular momentum.
3. relative motion
4. Kinematics and dynamics of a system of particles: Center of mass. Reduced mass. Center-of-mass reference system. Energy, linear and angular momentum of a system of particles.
5. Kinematics and Dynamics of a rigid body: Angular momentum, moment of inertia and gyration radius. Equation of motion of the rigid body. Rotation kinetic energy.
6. Oscillations: the harmonic oscillator. Damped harmonic oscillator. Forced harmonic oscillator. Resonances. Normal modes. Small oscillations.
7. Waves: wave equation. Harmonic waves. Standing waves. Travelling waves. Phase velocity and Group velocity.

**LEARNING ACTIVITIES AND METHODOLOGY**

- AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems
- AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on-site attendance.
- AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK. Subjects with 6 credits have 98 hours/0% on-site.
- AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.
- AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours (aprox), 100% on-site
- AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.
- MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning
- MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group
- MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor. Subjects with 6 credits have 4 hours of tutoring/100% on-site.
- MD6. LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

**ASSESSMENT SYSTEM**

- SE1. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The final exam's weight is 60%. The final exam grade should be higher than 3 points out of a maximum grade of 10 points.
- SE2. CONTINUOUS EVALUATION. Assesses papers, projects, class presentations, debates, exercises, internships and Lab reports. The weight of this part is 40%, of which 25% correspond to three midterm

exams and the remaining 15% correspond to the works assigned during the Lab sessions . The attendance to Lab sessions is compulsory to pass the subject.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

#### BASIC BIBLIOGRAPHY

- P. Tipler & G. Mosca Physics for scientists and engineers, Freeman, 2003
- R.A Serway and J.W. Serway Physics for scientist and engineers, Thomson Brooks, 2004