Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
ING116-A	Physics I	1	3	0	2	4	5

Prerequisites	
Admission Requirements	
Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The primary objective of this course is to help students comprehend the fundamental principles and laws of classical mechanics through a solid mathematical foundation (vector analysis, differential and integral calculus). The course aims to develop students' skills in observing physical phenomena in nature, modeling them mathematically, and solving these models using an analytical thinking approach. Ultimately, it seeks to equip students with the foundational problem-solving formation they will need in their future engineering and specialized courses.
Content	-1. Mathematical Introduction • Vector analysis (Scalar/dot and vector/cross products) • Cartesian and cylindrical coordinate systems • Applications of differential and integral calculus • Differential equations (Fundamental level for mechanics) 2. Kinematics • Motion in one dimension (Position, velocity, and acceleration vectors) • Motion in two and three dimensions (Projectile motion) • Uniform circular motion 3. Dynamics • Concept of force and free-body diagrams • Newton's Laws of Motion • Friction force and dynamics of circular motion (Centripetal force) 4. Kinetics (Work and Energy) • Work-Kinetic Energy Theorem • Conservative and non-conservative forces • Potential energy • Conservation of mechanical energy 5. Linear Momentum and Collisions • Center of mass (Transition from point particles to rigid bodies) • Linear momentum and Impulse • Conservation of linear momentum • Elastic and inelastic collisions 6. Rotational Kinematics and Dynamics • Rotational kinematics of rigid bodies • Moment of inertia and rotational kinetic energy • Torque and Newton's 2nd Law for rotational motion • Angular Momentum and its conservation • Rolling motion (Combination of translation and rotation) 7. Oscillations and Simple Harmonic Motion (SHM) • Hooke's Law and restoring force • Kinematic equations of SHM (Time dependence of position, velocity, and acceleration) • Energy transformations and conservation in SHM • Applications: Simple pendulum and physical pendulum • Introduction to damped and driven oscillations, Resonance
References	- “Physique PTSI”, TecDoc Lavoisier, 2008. - “Physique PTSI”, Hprepa Hachette, 2007 - Lecture Notes and Exercises: http://uni.gsu.edu.tr/moodle/course/

Theory Topics

Week	Weekly Contents