Content

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

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	-
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	

Theory Topics

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