

## 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	<p>-1. Mathematical Introduction</p> <ul style="list-style-type: none"><li>• Vector analysis (Scalar/dot and vector/cross products)</li><li>• Cartesian and cylindrical coordinate systems</li><li>• Applications of differential and integral calculus</li><li>• Differential equations (Fundamental level for mechanics)</li></ul> <p>2. Kinematics</p> <ul style="list-style-type: none"><li>• Motion in one dimension (Position, velocity, and acceleration vectors)</li><li>• Motion in two and three dimensions (Projectile motion)</li><li>• Uniform circular motion</li></ul> <p>3. Dynamics</p> <ul style="list-style-type: none"><li>• Concept of force and free-body diagrams</li><li>• Newton's Laws of Motion</li><li>• Friction force and dynamics of circular motion (Centripetal force)</li></ul> <p>4. Kinetics (Work and Energy)</p> <ul style="list-style-type: none"><li>• Work-Kinetic Energy Theorem</li><li>• Conservative and non-conservative forces</li><li>• Potential energy</li><li>• Conservation of mechanical energy</li></ul> <p>5. Linear Momentum and Collisions</p> <ul style="list-style-type: none"><li>• Center of mass (Transition from point particles to rigid bodies)</li><li>• Linear momentum and Impulse</li><li>• Conservation of linear momentum</li><li>• Elastic and inelastic collisions</li></ul> <p>6. Rotational Kinematics and Dynamics</p> <ul style="list-style-type: none"><li>• Rotational kinematics of rigid bodies</li><li>• Moment of inertia and rotational kinetic energy</li><li>• Torque and Newton's 2nd Law for rotational motion</li><li>• Angular Momentum and its conservation</li><li>• Rolling motion (Combination of translation and rotation)</li></ul> <p>7. Oscillations and Simple Harmonic Motion (SHM)</p> <ul style="list-style-type: none"><li>• Hooke's Law and restoring force</li><li>• Kinematic equations of SHM (Time dependence of position, velocity, and acceleration)</li><li>• Energy transformations and conservation in SHM</li><li>• Applications: Simple pendulum and physical pendulum</li><li>• Introduction to damped and driven oscillations, Resonance</li></ul>
References	

## Theory Topics

Week	Weekly Contents
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